GE Medical Systems

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Revision 3

GE Medical Systems
LOGIQ™ 9 Proprietary Manual

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Important Precautions

WARNING

- **THIS SERVICE MANUAL IS AVAILABLE IN ENGLISH ONLY.**
- **IF A CUSTOMER'S SERVICE PROVIDER REQUIRES A LANGUAGE OTHER THAN ENGLISH, IT IS THE CUSTOMER'S RESPONSIBILITY TO PROVIDE TRANSLATION SERVICES.**
- **DO NOT ATTEMPT TO SERVICE THE EQUIPMENT UNLESS THIS SERVICE MANUAL HAS BEEN CONSULTED AND IS UNDERSTOOD.**
- **FAILURE TO HEED THIS WARNING MAY RESULT IN INJURY TO THE SERVICE PROVIDER, OPERATOR OR PATIENT FROM ELECTRIC SHOCK, MECHANICAL OR OTHER HAZARDS.**

AVERTISSEMENT

- **CE MANUEL DE MAINTENANCE N'EST DISPONIBLE QU'EN ANGLAIS.**
- **SI LE TECHNICIEN DU CLIENT A BESOIN DE CE MANUEL DANS UNE AUTRE LANGUE QUE L'ANGLAIS, C'EST AU CLIENT QU'IL INCOMBE DE LE FAIRE TRADUIRE.**
- **NE PAS TENTER D'INTERVENTION SUR LES ÉQUIPEMENTS TANT QUE LE MANUEL SERVICE N'A PAS ÉTÉ CONSULTÉ ET COMPRIS.**
- **LE NON-RESPECT DE CET AVERTISSEMENT PEUT ENTRAÎNER CHEZ LE TECHNICIEN, L'OPÉRATEUR OU LE PATIENT DES BLESSURES DUES À DES DANGERS ÉLECTRIQUES, MÉCANIQUES OU AUTRES.**

WARNUNG

- **DIESES KUNDENDIENST-HANDBUCH EXISTIERT NUR IN ENGLISCHER SPRACHE.**
- **FALLS EIN FREMDER KUNDENDIENST EINE ANDERE SPRACHE BENÖTIGT, IST ES AUFGABE DES KUNDEN FÜR EINE ENTSPRECHENDE ÜBERSETZUNG ZU SORGEN.**
- **VERSUCHEN SIE NICHT, DAS GERÄT ZU REPARIEREN, BEVOR DIESES KUNDENDIENST-HANDBUCH NICHT ZU RATE GEZOGEN UND VERSTANDEN WURDE.**
- **WIRD DIESE WARNUNG NICHT BEACHTET, SO KANN ES ZU VERLETZUNGEN DES KUNDENDIENSTTECHNIKERS, DES BEDIENERS ODER DES PATIENTEN DURCH ELEKTRISCHE SCHLÄGE, MECHANISCHE ODER SONSTIGE GEFAHREN KOMMEN.**

AVISO

- **ESTE MANUAL DE SERVICIO SÓLO EXISTE EN INGLÉS.**
- **SI ALGÚN PROVEEDOR DE SERVICIOS AJENO A GEMS SOLICITA UN IDIOMA QUE NO SEA EL INGLÉS, ES RESPONSABILIDAD DEL CLIENTE OFRECER UN SERVICIO DE TRADUCCIÓN.**
- **NO SE DEBERÁ DAR SERVICIO TÉCNICO AL EQUIPO, SIN HABER CONSULTADO Y COMPRENDIDO ESTE MANUAL DE SERVICIO.**
- **LA NO OBSERVANCIA DEL PRESENTE AVISO PUEDE DAR LUGAR A QUE EL PROVEEDOR DE SERVICIOS, EL OPERADOR O EL PACIENTE SUFRAN LESIONES PROVOCADAS POR CAUSAS ELÉCTRICAS, MECÁNICAS O DE OTRA NATURALEZA.**

ATENÇÃO

- **ESTE MANUAL DE ASSISTÊNCIA TÉCNICA SÓ SE ENCONTRA DISPONÍVEL EM INGLÊS.**
- **SE QUALQUER OUTRO SERVIÇO DE ASSISTÊNCIA TÉCNICA, QUE NÃO A GEMS, SOLICITAR ESTES MANUAIS NOUTRO IDIOMA, É DA RESPONSABILIDADE DO CLIENTE FORNECER OS SERVIÇOS DE TRADUÇÃO.**
- **NÃO TENTE REPARAR O EQUIPAMENTO SEM TER CONSULTADO E COMPREENDIDO ESTE MANUAL DE ASSISTÊNCIA TÉCNICA.**
- **O NÃO CUMPRIMENTO DESTE AVISO PODE POR EM PERIGO A SEGURANÇA DO TÉCNICO, OPERADOR OU PACIENTE DEVIDO A‘ CHOQUES ELÉTRICOS, MECÂNICOS OU OUTROS.**

AVVERTENZA

- **IL PRESENTE MANUALE DI MANUTENZIONE È DISPONIBILE SOLTANTO IN INGLESE.**
- **SE UN ADDETTO ALLA MANUTENZIONE ESTERNO ALLA GEMS RICHIEDE IL MANUALE IN UNA LINGUA DIVERSA, IL CLIENTE È TENUTO A PROVVEDERE DIRETTAMENTE ALLA TRADUZIONE.**
- **SI PROCEDA ALLA MANUTENZIONE DELL’APPARECCHIATURA SOLO DOPO AVER CONSULTATO IL PRESENTE MANUALE ED AVERNE COMPRESO IL CONTENUTO.**
- **NON TENERE CONTO DELLA PRESENTE AVVERTENZA POTREBBE FAR COMPIERE OPERAZIONI DA CUI DERIVINO LESIONI ALL’ADDETTO ALLA MANUTENZIONE, ALL’UTILIZZATORE ED AL PAZIENTE PER FOLGORAZIONE ELETTRICA, PER URTI MECCANICI OD ALTRI RISCHI.**

このサービスマニュアルには英語版しかありません。

ＧＥＭＳ以外でサービスを担当される業者が英語以外の言語を要求される場合、翻訳作業はその業者の責任で行うものとさせていただきます。

警告

このサービスマニュアルを熟読し理解せずに、装置のサービスを行わないで下さい。

この警告に従わない場合、サービスを担当される方、操作員あるいは患者さんが、感電や機械的又はその他の危険により負傷する可能性があります。

本维修手册仅存有英文本。

非 GEMS 公司的维修员要求非英文本的维修手册时，客户需自行负责翻译。

注意：

未详细阅读和完全了解本手册之前，不得进行维修。

忽略本注意事项会对维修员，操作员或病人造成触电，机械伤害或其他伤害。

DAMAGE IN TRANSPORTATION - FOR USA ONLY

All packages should be closely examined at time of delivery. If damage is apparent write “Damage In Shipment” on ALL copies of the freight or express bill BEFORE delivery is accepted or “signed for” by a GE representative or hospital receiving agent. Whether noted or concealed, damage MUST be reported to the carrier immediately upon discovery, or in any event, within 14 days after receipt, and the contents and containers held for inspection by the carrier. A transportation company will not pay a claim for damage if an inspection is not requested within this 14 day period.

For USA Only

Call Traffic and Transportation, Milwaukee, WI (262) 827-3468 or 8*285-3468 immediately after damage is found. At this time be ready to supply name of carrier, delivery date, consignee name, freight or express bill number, item damaged and extent of damage.

For USA Only

Complete instructions regarding claim procedure are found in Section “S” of the Policy And Procedures Bulletins.

CERTIFIED ELECTRICAL CONTRACTOR STATEMENT - FOR USA ONLY

All electrical Installations that are preliminary to positioning of the equipment at the site prepared for the equipment shall be performed by licensed electrical contractors. Other connections between pieces of electrical equipment, calibrations and testing shall be performed by qualified GE Medical Systems personnel. In performing all electrical work on these products, GE will use its own specially trained field engineers. All of GE’s electrical work on these products will comply with the requirements of the applicable electrical codes.

The purchaser of GE equipment shall only utilize qualified personnel (i.e., GE’s field engineers, personnel of third-party service companies with equivalent training, or licensed electricians) to perform electrical servicing on the equipment.

OMISSIONS & ERRORS

If there are any omissions, errors or suggestions for improving this documentation, please contact the GE Medical Systems Global Documentation Group with specific information listing the system type, manual title, part number, revision number, page number and suggestion details. E-mail the information to : **UltrasoundDocError@med.ge.com**

GE Medical Systems employees should use the Customer Quality Assurance (CQA) System to report all documentation omissions, errors or suggestions.

Revision History

Revision	Date	Reason for change
0	April 8, 2002	Initial Release
1	November 8, 2002	Update for BT'02 Release, BEP and FEP changes
2	April 4, 2003	Update for R2.1.1 Release and hardware changes
3	October 23, 2003	Update for R3.0 Release and hardware changes

List of Effected Pages

Pages	Revision	Pages	Revision	Pages	Revision
Title Page	N/A	Chapter 2 - Pre-Installation pages 2-1 to 2-10	3	Chapter 7 - Diagnostics/ Troubleshooting pages 7-1 to 7-80	3
Important Precautions pages i to iv	3	Chapter 3 - Installation pages 3-1 to 3-46	3	Chapter 8 - Replacement Procedures pages 8-1 to 8-194	3
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Chapter 1
Introduction

Section 1-1
Overview

1-1-1 Purpose of Chapter 1

This chapter describes important issues related to safely servicing the LOGIQ™ 9 scanner. The service provider must read and understand all the information presented in this manual before installing or servicing a unit.

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1-3	Safety Considerations	1-7
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1-5	Customer Assistance	1-11

1-1-2 Purpose of Service Manual

This Service Manual provides installation and service information for the LOGIQ™ 9 Ultrasound Scanning System and contains the following chapters:

1.) **Chapter 1 - Introduction:** Contains a content summary and warnings.
2.) **Chapter 2 - Pre-Installation:** Contains pre-installation requirements for the LOGIQ™ 9.
3.) **Chapter 3 - Installation:** Contains installation procedures.
4.) **Chapter 4 - Functional Checks:** Contains functional checks that are recommended as part of the installation, or as required during servicing and periodic maintenance.
5.) **Chapter 5 - Components and Functions (Theory):** Contains block diagrams and functional explanations of the electronics.
6.) **Chapter 6 - Service Adjustments:** Contains instructions on how to make available adjustments to the LOGIQ™ 9.
7.) **Chapter 7 - Diagnostics/Troubleshooting:** Provides procedures for running diagnostic or related routines for the LOGIQ™ 9.
8.) **Chapter 8 - Replacement Procedures:** Provides disassembly procedures and reassembly procedures for all changeable Field Replaceable Units (FRU).
9.) **Chapter 9 - Renewal Parts:** Contains a complete list of field replaceable parts for the LOGIQ™ 9.
10.) **Chapter 10 - Periodic Maintenance:** Provides periodic maintenance procedures for the LOGIQ™ 9.

1-1-3 Typical Users of the Basic Service Manual

- Service Personnel (installation, maintenance, etc.).
- Hospital's Service Personnel
- Contractors (Some parts of Chapter 2 - Pre-Installation)

1-1-4 LOGIQ™ 9 Models Covered by this Manual

Table 1-2 LOGIQ™ 9 Model Designations

Part Number	Description
2188900	LOGIQ™ 9 120 V Console & Peripherals - BEP1.0
2188900-2	LOGIQ™ 9 240V Console & Peripherals - BEP1.0
2188900-3	LOGIQ™ 9 120V Console & 240V Peripherals - BEP1.0
2188900-4	LOGIQ™ 9 120 V Console & Peripherals - BEP2.0
2188900-5	LOGIQ™ 9 240V Console & Peripherals - BEP2.0
2188900-6	LOGIQ™ 9 120V Console & 240V Peripherals - BEP2.0
2351100	LOGIQ™ 9 120 V Console & Peripherals - BEP2.1 BT'02
2351100-2	LOGIQ™ 9 240V Console & Peripherals - BEP2.1 BT'02
2351100-3	LOGIQ™ 9 120V Console & 240V Peripherals - BEP2.1 BT'02
2375600	LOGIQ™ 9 120 V Console & Peripherals - BEP2.2 BT'03
2375600-2	LOGIQ™ 9 240V Console & Peripherals - BEP2.2 BT'03
2375600-3	LOGIQ™ 9 120V Console & 240V Peripherals - BEP2.2 BT'03

1-1-5 Purpose of Operator Manual(s)

The Operator Manual(s) should be fully read and understood before operating the LOGIQ™ 9 and also kept near the unit for quick reference.

Section 1-2
Important Conventions

1-2-1 Conventions Used in Book

Icons

Pictures, or icons, are used wherever they reinforce the printed message. The icons, labels and conventions used on the product and in the service information are described in this chapter.

Safety Precaution Messages

Various levels of safety precaution messages may be found on the equipment and in the service information. The different levels of concern are identified by a flag word that precedes the precautionary message. Known or potential hazards are labeled in one of following ways:

⚠ DANGER **DANGER IS USED TO INDICATE THE PRESENCE OF A HAZARD THAT WILL CAUSE SEVERE PERSONAL INJURY OR DEATH IF THE INSTRUCTIONS ARE IGNORED.**

⚠ WARNING ***WARNING IS USED TO INDICATE THE PRESENCE OF A HAZARD THAT CAN CAUSE SEVERE PERSONAL INJURY AND PROPERTY DAMAGE IF INSTRUCTIONS ARE IGNORED.***

⚠ CAUTION **Caution is used to indicate the presence of a hazard that will or can cause minor personal injury and property damage if instructions are ignored.**

⚠ NOTICE **Equipment Damage Possible**

Notice is used when a hazard is present that can cause property damage but has absolutely no personal injury risk.

Example: Disk drive will crash.

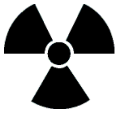
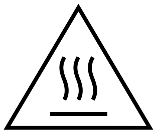
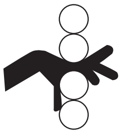
*NOTE: Notes provide important information about an item or a procedure.
Information contained in a NOTE can often save you time or effort.*

1-2-2 Standard Hazard Icons

Important information will always be preceded by the exclamation point contained within a triangle, as seen throughout this chapter. In addition to text, several different graphical icons (symbols) may be used to make you aware of specific types of hazards that could cause harm.

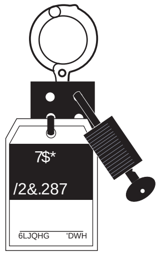
⚠

Table 1-3 Standard Hazard Icons

ELECTRICAL	MECHANICAL	RADIATION
		
LASER	**HEAT**	**PINCH**
		

Other hazard icons make you aware of specific procedures that should be followed.

Table 1-4 Standard Icons Indicating a Special Procedure Be Used

AVOID STATIC ELECTRICITY	TAG AND LOCK OUT	WEAR EYE PROTECTION
		

1-2-3 Product Icons

The following table describes the purpose and location of safety labels and other important information provided on the equipment.

Table 1-5 Product Icons

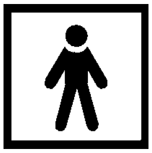
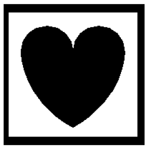
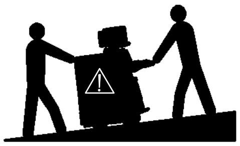
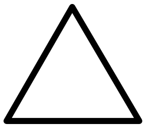
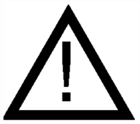
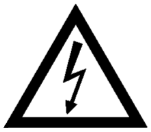
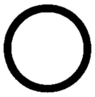
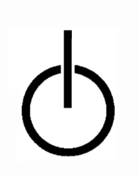
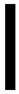
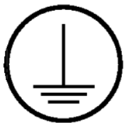
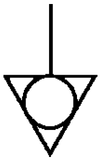
LABEL/SYMBOL	PURPOSE/MEANING	LOCATION
Identification and Rating Plate	Manufacturer's name and address Date of manufacture Model and serial numbers Electrical ratings	Rear of console near power inlet Under monitor On each probe
Device Listing/Certification Labels	Laboratory logo or labels denoting conformance with industry safety standards such as UL or IEC.	Rear of console Under front of monitor
Type/Class Label	Used to indicate the degree of safety or protection.	
IP Code (IPX8)	Indicates the degree of protection provided by the enclosure per IEC 529. IPX8 indicates drip proof.	Footswitch
	Equipment Type BF (man in the box symbol) IEC 878-02-03 indicates B Type equipment having even more electrical isolation than standard Type B equipment because it is intended for intimate patient contact.	Probe connectors PCG connector or Rear of Console
	Equipment Type CF (heart in the box symbol) IEC 878-02-05 indicates equipment having a high degree of protection suitable for direct cardiac contact.	ECG connector Surgical probes
“CAUTION This unit weighs... Special care must be used to avoid..." 	This precaution is intended to prevent injury that may result if one person attempt to move the unit considerable distances or on an incline due to the weight of the unit.	On the console where easily seen during transport
	"CAUTION" The equilateral triangle is usually used in combination with other symbols to advise or warn the user.	Various

Table 1-5 Product Icons (Continued)

LABEL/SYMBOL	PURPOSE/MEANING	LOCATION
	ATTENTION - Consult accompanying documents " is intended to alert the user to refer to the operator manual or other instructions when complete information cannot be provided on the label.	Various
	"CAUTION - Dangerous voltage" (the lightning flash with arrowhead in equilateral triangle) is used to indicate electric shock hazards.	Various
	"Mains OFF" Indicates the power off position of the mains power switch.	Rear of system adjacent to mains switch
	"OFF/Standby" Indicates the power off/ standby position of the power switch. **CAUTION** **This Power Switch DOES NOT ISOLATE Mains Supply**	Adjacent to On-Off/Standby Switch
	"Mains ON" Indicates the power on position of the mains power switch. "ON" Indicates the power on position of the power switch. **CAUTION** **This Power Switch DOES NOT ISOLATE Mains Supply**	Front Panel Switch
	"Protective Earth" Indicates the protective earth (grounding) terminal.	Internal
	Indicates an earth GROUND potential	Product schematics Peripherals
	"Equipotentiality" Indicates the terminal to be used for connecting equipotential conductors when interconnecting (grounding) with other equipment.	Rear of console

Section 1-3
Safety Considerations

1-3-1 Introduction

The following safety precautions must be observed during all phases of operation, service and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual, violates safety standards of design, manufacture and intended use of the equipment.

1-3-2 Human Safety

Operating personnel must not remove the system covers.
Servicing should be performed by authorized personnel only.
Only personnel who have participated in a LOGIQ™ 9 Training are authorized to service the equipment.

1-3-3 Mechanical Safety

⚠ **WARNING** ***WHEN THE UNIT IS RAISED FOR A REPAIR OR MOVED ALONG ANY INCLINE, USE EXTREME CAUTION SINCE IT MAY BECOME UNSTABLE AND TIP OVER.***

⚠ **WARNING** ***ULTRASOUND PROBES ARE HIGHLY SENSITIVE MEDICAL INSTRUMENTS THAT CAN EASILY BE DAMAGED BY IMPROPER HANDLING. USE CARE WHEN HANDLING AND PROTECT FROM DAMAGE WHEN NOT IN USE. DO NOT USE A DAMAGED OR DEFECTIVE PROBE. FAILURE TO FOLLOW THESE PRECAUTIONS CAN RESULT IN SERIOUS INJURY AND EQUIPMENT DAMAGE.***

⚠ **WARNING** ***NEVER USE A PROBE THAT HAS FALLEN TO THE FLOOR. EVEN IF IT LOOKS OK, IT MAY BE DAMAGED.***

⚠ **CAUTION** **Always lower and center the Opertaor I/O Panel before moving the scanner.**

⚠ **CAUTION** **The LOGIQ™ 9 weighs 225 kg or more, depending on installed peripherals, (500 lbs., or more) when ready for use. Care must be used when moving it or replacing its parts. Failure to follow the precautions listed could result in injury, uncontrolled motion and costly damage.**

ALWAYS:

Be sure the pathway is clear.

Use slow, careful motions.

Use two people when moving on inclines or lifting more than 16 kg (35 lbs).

1-3-3Mechanical Safety (cont'd)

NOTE: Special care should be taken when transporting the unit in a vehicle:

- *Secure the unit in an upright position.*
- *Lock the wheels (brake)*
- *DO NOT use the Control Panel as an anchor point.*
- *Place the probes in their carrying case.*
- *Eject any Magneto Optical disk or CD from their drive.*

⚠ **CAUTION** **Keep the heat venting holes on the monitor unobstructed to avoid overheating of the monitor.**

1-3-4 Electrical Safety

To minimize shock hazard, the equipment chassis must be connected to an electrical ground. The system is equipped with a three-conductor AC power cable. This must be plugged into an approved electrical outlet with safety ground. If an extension cord is used with the system, make sure that the total current rating of the system does not exceed the extension cord rating.

The power outlet used for this equipment should not be shared with other types of equipment.

Both the system power cable and the power connector meet international electrical standards.

1-3-5 Labels Locations

Refer to the LOGIQ™ 9 Basic User Manual, Chapter 2, for the label locations.

1-3-6 Dangerous Procedure Warnings

Warnings, such as the examples below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

⚠ **DANGER** **DANGEROUS VOLTAGES, CAPABLE OF CAUSING DEATH, ARE PRESENT IN THIS EQUIPMENT. USE EXTREME CAUTION WHEN HANDLING, TESTING AND ADJUSTING.**

⚠ **WARNING** ***EXPLOSION WARNING***

DO NOT OPERATE THE EQUIPMENT IN AN EXPLOSIVE ATMOSPHERE. OPERATION OF ANY ELECTRICAL EQUIPMENT IN SUCH AN ENVIRONMENT CONSTITUTES A DEFINITE SAFETY HAZARD.

⚠ **WARNING** ***DO NOT SUBSTITUTE PARTS OR MODIFY EQUIPMENT***

BECAUSE OF THE DANGER OF INTRODUCING ADDITIONAL HAZARDS, DO NOT INSTALL SUBSTITUTE PARTS OR PERFORM ANY UNAUTHORIZED MODIFICATION OF THE EQUIPMENT.

1-3-7 Lockout/Tagout Requirements (For USA Only)

Follow OSHA Lockout/Tagout requirements by ensuring you are in total control of the electrical Mains plug.

1-3-8 Returning/Shipping Probes and Repair Parts

Equipment being returned must be clean and free of blood and other infectious substances.

GEMS policy states that body fluids must be properly removed from any part or equipment prior to shipment. GEMS employees, as well as customers, are responsible for ensuring that parts/equipment have been properly decontaminated prior to shipment. Under no circumstance should a part or equipment with visible body fluids be taken or shipped from a clinic or site (for example, body coils or an ultrasound probe).

The purpose of the regulation is to protect employees in the transportation industry, as well as the people who will receive or open this package.

NOTE: The US Department of Transportation (DOT) has ruled that “items that were saturated and/or dripping with human blood that are now caked with dried blood; or which were used or intended for use in patient care” are “regulated medical waste” for transportation purposes and must be transported as a hazardous material.

Section 1-4
EMC, EMI, and ESD

1-4-1 Electromagnetic Compatibility (EMC)

Electromagnetic compatibility describes a level of performance of a device within its electromagnetic environment. This environment consists of the device itself and its surroundings including other equipment, power sources and persons with which the device must interface. Inadequate compatibility results when a susceptible device fails to perform as intended due interference from its environment or when the device produces unacceptable levels of emission to its environment. This interference is often referred to as radio–frequency or electromagnetic interference (RFI/EMI) and can be radiated through space or conducted over interconnecting power of signal cables. In addition to electromagnetic energy, EMC also includes possible effects from electrical fields, magnetic fields, electrostatic discharge and disturbances in the electrical power supply.

1-4-2 CE Compliance

The LOGIQ™ 9 unit conforms to all applicable conducted and radiated emission limits and to immunity from electrostatic discharge, radiated and conducted RF fields, magnetic fields and power line transient requirements.

For applicable standards refer to the Safety Chapter in the Basic User Manual.

NOTE: ***For CE Compliance, it is critical that all covers, screws, shielding, gaskets, mesh, clamps, are in good condition, installed tightly without skew or stress. Proper installation following all comments noted in this service manual is required in order to achieve full EMC performance.***

1-4-3 Electrostatic Discharge (ESD) Prevention

WARNING ***DO NOT TOUCH ANY BOARDS WITH INTEGRATED CIRCUITS PRIOR TO TAKING THE NECESSARY ESD PRECAUTIONS:***

1.ALWAYS CONNECT YOURSELF, VIA AN ARM-WRIST STRAP, TO THE ADVISED ESD CONNECTION POINT LOCATED ON THE REAR OF THE SCANNER (TO THE RIGHT OF THE POWER CONNECTOR).

2.FOLLOW GENERAL GUIDELINES FOR HANDLING OF ELECTROSTATIC SENSITIVE EQUIPMENT.

Section 1-5
Customer Assistance

1-5-1 Contact Information

If this equipment does not work as indicated in this service manual or in the User Manual, or if you require additional assistance, please contact the local distributor or appropriate support resource, as listed below.

Prepare the following information before you call:

- System ID serial number.
- Software version.

Table 1-6 Phone Numbers for Customer Assistance

Location	Phone Number
USA/ Canada GE Medical Systems Ultrasound Service Engineering 4855 W. Electric Avenue Milwaukee, WI 53219 Customer Answer Center	Service 1-800–437–1171 Applications 1-800-682-5327 1-262-524-5698 Fax: +1-414-647-4125
Latin America GE Medical Systems Ultrasound Service Engineering 4855 W. Electric Avenue Milwaukee, WI 53219 Customer Answer Center	Service 1-262-524-5300 Applications 1-262-524-5698 Fax: +1-414-647-4125
Europe GE Ultraschall Deutschland GmbH& Co. KG BeethovenstraBe 239 Postfach 11 05 60, D-42665 Solingen Germany	Tel: +49 212 2802 208 +49 212 2802 207 Fax: +49 212 2802 431
Asia (Singapore/ Japan) GE Ultrasound Asia Service Department - Ultrasound 298 Tiong Bahru Road #15-01/06 Central Plaza Singapore 169730	Tel: +65 291-8528 +81 426-482950 Fax: +65 272-3997 +81 426-482902

1-5-2 System Manufacturer

Table 1-7 System Manufacturer

Manufacturer	FAX Number
GE Medical Systems - Americas P.O. Box 414 Milwaukee, Wisconsin 53201-0414	414-647-4090

Chapter 2
Pre-Installation

Section 2-1
Overview

2-1-1 Purpose of Chapter 2

This chapter provides the information required to plan and prepare for the installation of a LOGIQ™ 9. Included are descriptions of the facility and electrical needs to be met by the purchaser of the unit.

Table 2-1 Contents in Chapter 2

Section	Description	Page Number
2-1	Overview	2-1
2-2	General Console Requirements	2-2
2-3	Facility Needs	2-6

Section 2-2
General Console Requirements

2-2-1 Console Environmental Requirements

Table 2-2 Environmental Requirements

Operating Temperature	Storage Temperature	Humidity	Heat Dissipation
0 to 40°C (32 to 104°F)	-40 to 70 °C (-40 to 158°F)	< 90% rH non-condensing	3500 BTU pr hour

2-2-1-1 Cooling

The cooling requirement for the LOGIQ™ 9 is 3500 BTU/hr. This figure does not include cooling needed for lights, people, or other equipment in the room. Each person in the room places an additional 300 BTU/hr. demand on the cooling system.

2-2-1-2 Lighting

Bright light is needed for system installation, updates and repairs. However, operator and patient comfort may be optimized if the room light is subdued and indirect. Therefore a combination lighting system (dim/bright) is recommended. Keep in mind that lighting controls and dimmers can be a source of EMI which could degrade image quality. These controls should be selected to minimize possible interference.

2-2-2 Electrical Requirements

NOTE: *GE Medical Systems requires a dedicated power and ground for the proper operation of its Ultrasound equipment. This dedicated power shall originate at the last distribution panel before the system.*

Sites with a mains power system with defined Neutral and Live:

The dedicated line shall consist of one phase, a neutral (not shared with any other circuit), and a full size ground wire from the distribution panel to the Ultrasound outlet.

Sites with a mains power system without a defined Neutral:

The dedicated line shall consist of one phase (two lines), not shared with any other circuit, and a full size ground wire from the distribution panel to the Ultrasound outlet.

NOTE: *Please note that image artifacts can occur, if at any time within the facility, the ground from the main facility's incoming power source to the Ultrasound unit is only a conduit.*

2-2-2-1 LOGIQ™ 9 Power Requirements

Table 2-3 Electrical Specifications for LOGIQ™ 9

Voltage	Tolerances	Current	Frequency
100-120 VAC	±10%	9.5 A	50-60 Hz
200-240 VAC	±10%	4.75 A	50-60 Hz

2-2-2-2 Inrush Current

Inrush current is not a factor to consider due to the inrush current limiting properties of the power supplies.

2-2-2-3 Site Circuit Breaker

It is recommended that the branch circuit breaker for the machine be readily accessible.

CAUTION **POWER OUTAGE MAY OCCUR.**

The LOGIQ™ 9 requires a dedicated single branch circuit. To avoid circuit overload and possible loss of critical care equipment, make sure you DO NOT have any other equipment operating on the same circuit.

2-2-2-4 Site Power Outlets

A dedicated AC power outlet must be within reach of the unit without extension cords. Other adequate outlets for the external peripherals, medical and test equipment needed to support this unit must also be present within 1 m (3.2 ft.) of the unit. Electrical installation must meet all current local, state, and national electrical codes.

2-2-2-5 Unit Power Plug

If the unit arrives without a power plug, or with the wrong plug, you must contact your GE dealer or the installation engineer must supply what is locally required.

2-2-2-6 Power Stability Requirements

Voltage drop-out

Max 10 ms.

Power Transients

(All applications)
Less than 25% of nominal peak voltage for less than 1 millisecond for any type of transient, including line frequency, synchronous, asynchronous, or aperiodic transients.

2-2-3 EMI Limitations

Ultrasound machines are susceptible to Electromagnetic Interference (EMI) from radio frequencies, magnetic fields, and transients in the air or wiring. Ultrasound machines also generate EMI. The LOGIQ™ 9 complies with limits as stated on the EMC label. However, there is no guarantee that interference will not occur in a particular installation.

Possible EMI sources should be identified before the unit is installed.

Electrical and electronic equipment may produce EMI unintentionally as the result of a defect. These sources include:

- medical lasers,
- scanners,
- cauterizing guns,
- computers,
- monitors,
- fans,
- gel warmers,
- microwave ovens,
- light dimmers
- portable phones.

The presence of a broadcast station or broadcast van may also cause interference.

See Table 2-4 for EMI Prevention tips.

Table 2-4 EMI Prevention/Abatement

EMI Rule	Details
Be aware of RF sources	Keep the unit at least 5 meters or 15 feet away from other EMI sources. Special shielding may be required to eliminate interference problems caused by high frequency, high powered radio or video broadcast signals.
Ground the unit	Poor grounding is the most likely reason a unit will have noisy images. Check grounding of the power cord and power outlet.
Replace all screws, RF gaskets, covers, cores	After you finish repairing or updating the system, replace all covers and tighten all screws. Any cable with an external connection requires a magnet wrap at each end. Install the shield over the front of card cage. Loose or missing covers or RF gaskets allow radio frequencies to interfere with the ultrasound signals.
Replace broken RF gaskets	If more than 20% or a pair of the fingers on an RF gasket are broken, replace the gasket. Do not turn on the unit until any loose metallic part is removed.
Do not place labels where RF gaskets touch metal	Never place a label where RF gaskets meet the unit. Otherwise, the gap created will permit RF leakage. Or, if a label has been found in such a position, move the label.
Use GE specified harnesses and peripherals	The interconnect cables are grounded and require ferrite beads and other shielding. Also, cable length, material, and routing are all important; do not change from what is specified.
Take care with cellular phones	Cellular phones may transmit a 5 V/m signal; that could cause image artifacts.
Properly dress peripheral cables	Do not allow cables to lie across the top of the card cage or hang out of the peripheral bays. Loop the excess length for peripheral cables inside the peripheral bays. Attach the monitor cables to the frame.

2-2-4 Scan Probe Environmental Requirements

Operation:10° to 40° C

Storage:-20° to 50° C

*NOTE: Temperature in degrees C. Conversion to Degrees F = (Degrees C * 9/5) + 32).*

⚠ NOTICE **SYSTEMS AND ELECTRONIC PROBES ARE DESIGNED FOR STORAGE TEMPERATURES OF -20 TO + 50 degrees C. WHEN EXPOSED TO LARGE TEMPERATURE VARIATIONS, THE PRODUCT SHOULD BE KEPT IN ROOM TEMPERATURE FOR 10 HOURS BEFORE USE.**

2-2-5 Time and Manpower Requirements

Site preparation takes time. Begin Pre-installation checks as soon as possible. If possible, allow six weeks before delivery, for enough time to make necessary changes.

⚠ CAUTION **Have two people available to deliver and unpack the LOGIQ™ 9.**
Attempts to move the unit considerable distances or on an incline by one person could result in injury or damage or both.

Section 2-3
Facility Needs

2-3-1 Purchaser Responsibilities

The work and materials needed to prepare the site is the responsibility of the purchaser. Delay, confusion, and waste of manpower can be avoided by completing pre installation work before delivery. Use the Pre installation checklist to verify that all needed steps have been taken. Purchaser responsibility includes:

- Procuring the materials required.
- Completing the preparations before delivery of the ultrasound system.
- Paying the costs for any alterations and modifications not specifically provided in the sales contract.

NOTE: All electrical installations that are preliminary to the positioning of the equipment at the site prepared for the equipment must be performed by licensed electrical contractors. Other connections between pieces of electrical equipment, calibrations, and testing must also be performed by qualified personnel. The products involved (and the accompanying electrical installations) are highly sophisticated and special engineering competence is required. All electrical work on these products must comply with the requirements of applicable electrical codes. The purchaser of GE equipment must only utilize qualified personnel to perform electrical servicing on the equipment.

The desire to use a non–listed or customer provided product or to place an approved product further from the system than the interface kit allows presents challenges to the installation team. To avoid delays during installation, such variances should be made known to the individuals or group performing the installation at the earliest possible date (preferably prior to the purchase).

The ultrasound suite must be clean prior to delivery of the machine. Carpet is not recommended because it collects dust and creates static. Potential sources of EMI (electromagnetic interference) should also be investigated before delivery. Dirt, static, and EMI can negatively impact system reliability.

2-3-2 Required Features

NOTE: *GE Medical Systems requires a dedicated power and ground for the proper operation of its Ultrasound equipment. This dedicated power shall originate at the last distribution panel before the system.*

Sites with a mains power system with defined Neutral and Live:

The dedicated line shall consist of one phase, a neutral (not shared with any other circuit), and a full size ground wire from the distribution panel to the Ultrasound outlet.

Sites with a mains power system without a defined Neutral:

The dedicated line shall consist of one phase (two lines), not shared with any other circuit, and a full size ground wire from the distribution panel to the Ultrasound outlet.

NOTE: *Please note that image artifacts can occur, if at any time within the facility, the ground from the main facility's incoming power source to the Ultrasound unit is only a conduit.*

- Door opening is at least 76 cm (30 in) wide.
- Proposed location for unit is at least 0.3 m (1 ft.) from the wall for cooling
- Power outlet and place for any external peripheral are within 2 m (6.5 ft) of each other with peripheral within 1 m of the unit to connect cables.

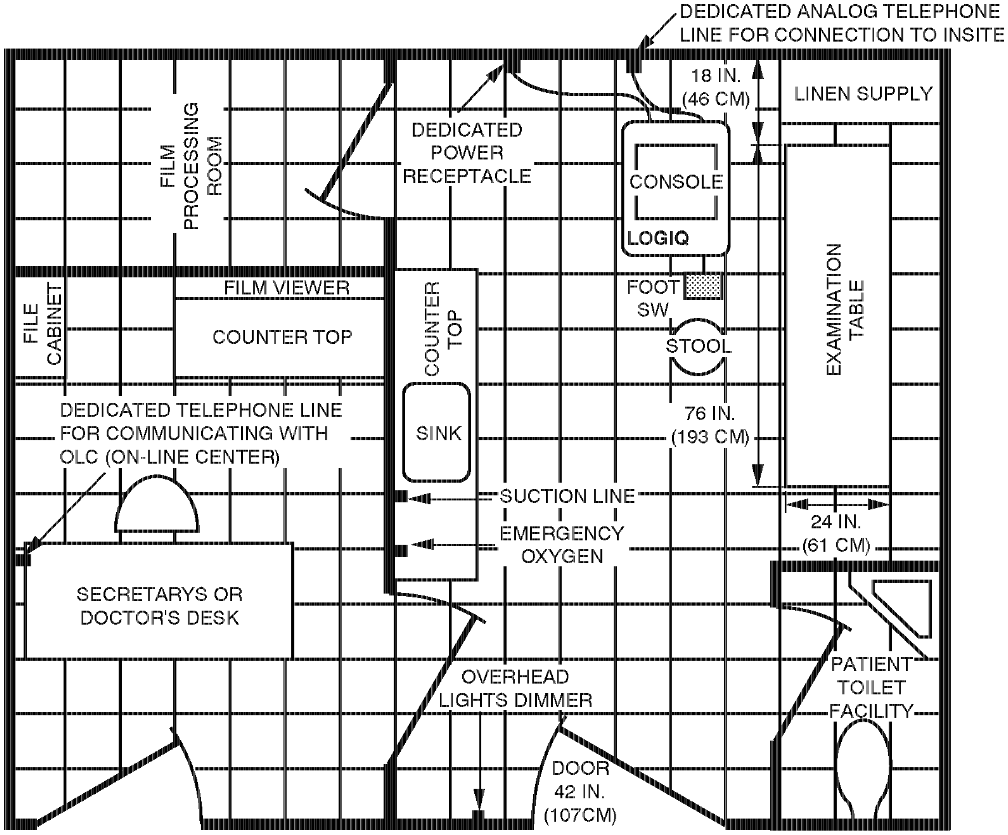
NOTE: *The LOGIQ™ 9 has four outlets inside the unit. One is for the monitor and three for on board peripherals.*

- Power outlets for other medical equipment and gel warmer
- Power outlets for test equipment and modem within 1 m (3.2 ft) of unit
- Clean and protected space to store transducers (in their cases or on a rack)
- Material to safely clean probes (done with a plastic container, never metal)

2-3-3 Desirable Features

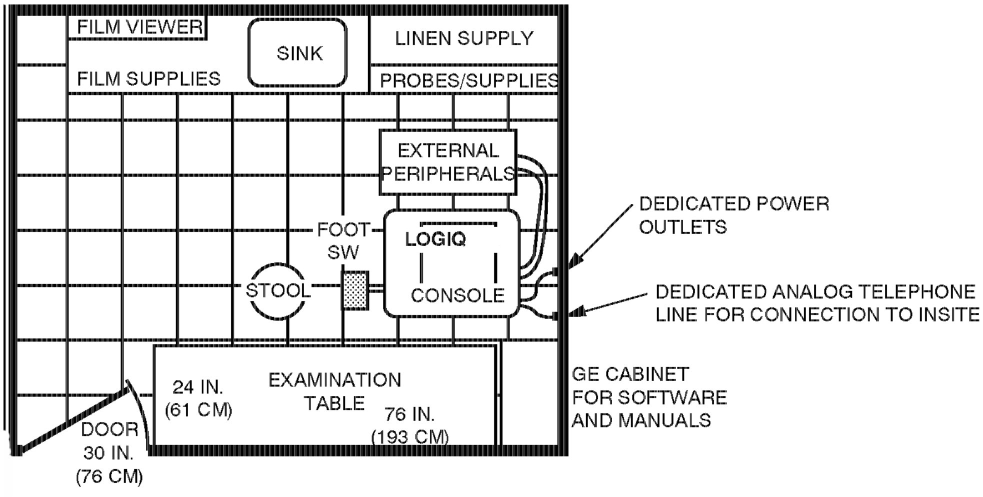
- Door is at least 92 cm (3 ft.) wide
- Circuit breaker for dedicated power outlet is easily accessible
- Sink with hot and cold water
- Receptacle for bio–hazardous waste, like used probe sheaths
- Emergency oxygen supply
- Storage for linens and equipment
- Nearby waiting room, lavatory, and dressing room
- Dual level lighting (bright and dim)
- Lockable cabinet ordered by GE for its software and proprietary manuals

2-3-4 Minimal Floor Plan Suggestion



A 14 by 17 foot Recommended Floor Plan

Scale: Each square equals one square foot



An 8 by 10 foot Minimal Floor Plan

Figure 2-1 Minimal Floor Plan

2-3-5 Networking Pre-installation Requirements

2-3-5-1 Purpose of the DICOM Network Function

DICOM services provide the operator with clinically useful features for moving images and patient information over a hospital network. Examples of DICOM services include the transfer of images to workstations for viewing or transferring images to remote printers. As an added benefit, transferring images in this manner frees up the on-board monitor and peripherals, enabling viewing to be done while scanning continues. With DICOM, images can be archived, stored, and retrieved faster, easier, and at a lower cost.

2-3-5-2 DICOM Option Pre-installation Requirements

To configure the LOGIQ™ 9 to work with other network connections, the site's network administrator must provide some necessary information.

Information must include:

- A host name, local port number, AE Title, IP address and Net Mask for the LOGIQ™ 9.
- The IP addresses for the default gateway and other routers at the site for ROUTING INFORMATION.
- The host name, IP address, port and AE Title for each device the site wants connected to the LOGIQ™ 9 for DICOM APPLICATION INFORMATION. A field for the make (manufacturer) and the revision of the device, is also included. This information may be useful for solving errors.

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Chapter 3
Installation

Section 3-1
Overview

3-1-1 The Purpose of Chapter 3

This chapter contains information needed to install the unit. Included are procedures to receive, unpack and configure the equipment.

Table 3-1 Contents in Chapter 3

Section	Description	Page Number
3-1	Overview	3-1
3-2	Installation Reminders	3-2
3-3	Receiving and Unpacking the Equipment	3-4
3-4	Preparing for Installation	3-5
3-5	Completing the Installation	3-6
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Section 3-2
Installation Reminders

3-2-1 Average Installation Time

Table 3-2 Average Installation Time

Description	Average Installation Time	Comments
Unpacking the scanner	0.5 hours	
Scanner wo/options	0.5 hours	Dependant on the required configuration
DICOM Option	0.5 - 2.0 hours	Dependant on the configuration amount
InSite Option	0.5 hours	

3-2-2 Installation Warnings

1.) Since the LOGIQ™ 9 weighs approximately 225 kg (500 lb.) without options, preferably two people should unpack it. Two people are also preferable for installing any additional items in excess of 35 pounds.

2.) There are no operator serviceable components. To prevent shock, do not remove any covers or panels. Should problems or malfunctions occur, unplug the power cord. Only qualified service personnel should carry out servicing and troubleshooting.

3.) After being transported, the unit may be very cold or hot. If this is the case, allow the unit to acclimate before you turn it on. It requires one hour for each 2.5°C increment it's temperature is below 10°C or above 40°C.

⚠ CAUTION **Equipment damage possibility. Turning the system on without acclimation after arriving at site may cause the system to be damaged.**

Table 3-3 Acclimation Time

°C	60	55	50	45	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40
°F	140	131	122	113	104	96	86	77	68	59	50	41	32	23	14	5	-4	-13	-22	-31	-40
hrs	8	6	4	2	0	0	0	0	0	0	0	2	4	6	8	10	12	14	16	18	20

3-2-2-1 Brake Pedal Operation

⚠ WARNING ***REMEMBER: If the front caster swivel lock is engaged for transportation, pressing the release pedal once disengages the swivel lock. You must depress the release pedal a second time to engage the brake.***

3-2-2-2 Operator I/O Panel Position

If weight is placed on the Operator I/O Panel in it's extended position the console could tip over.

⚠ WARNING ***The system should NOT be moved with the Operator I/O Panel extended. Move the Operator I/O Panel to it's centered and locked position. Lower the Operator I/O Panel as much as possible before moving the system.***

3-2-3 Safety Reminders

DANGER **WHEN USING ANY TEST INSTRUMENT THAT IS CAPABLE OF OPENING THE AC GROUND LINE (I.E., METER'S GROUND SWITCH IS OPEN), DON'T TOUCH THE UNIT!**

CAUTION **Two people should unpack the unit because of its weight. Two people are required whenever a part weighing 19kg (35 lb.) or more must be lifted.**

CAUTION **If the unit is very cold or hot, do not turn on its power until it has had a chance to acclimate to its operating environment.**

CAUTION **To prevent electrical shock, connect the unit to a properly grounded power outlet. Do not use a three to two prong adapter. This defeats safety grounding.**

CAUTION **Do NOT wear the ESD wrist strap when you work on live circuits and more than 30 V peak is present.**

CAUTION **Do not use a 20 Amp to 15 Amp adapter on the 120 Vac unit's power cord. This unit requires a dedicated 20 A circuit and can have a 15A plug if the on board peripherals do not cause the unit to draw more than 14.0 amps.**

CAUTION **Do not operate this unit unless all board covers and frame panels are securely in place. System performance and cooling require this.**

CAUTION **OPERATOR MANUAL(S)**
The User Manual(s) should be fully read and understood before operating the LOGIQ™ 9 and kept near the unit for quick reference.

CAUTION **ACOUSTIC OUTPUT HAZARD**
Although the ultrasound energy transmitted from the LOGIQ™ 9 probe is within FDA limits, avoid unnecessary exposure. Ultrasound energy can produce heat and mechanical damage.

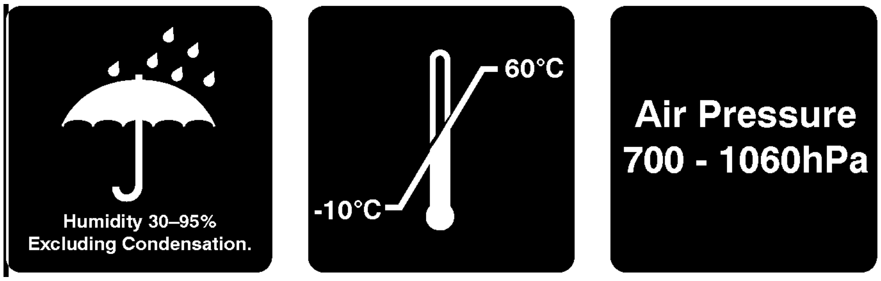
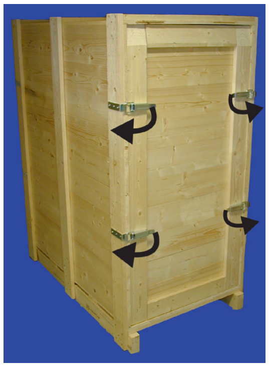
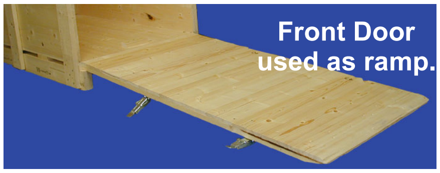
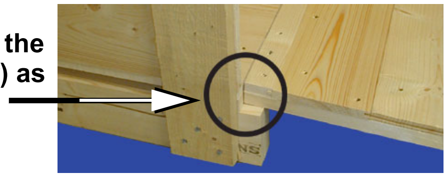
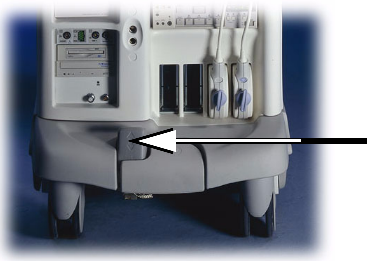


Figure 3-1 Environmental Labels

Section 3-3
Receiving and Unpacking the Equipment

CAUTION **Have two people available to unpack the LOGIQ™ 9. Attempts to move the unit considerable distances or on an incline by one person could result in injury or damage or both.**

Table 3-4 Unpacking Procedure

Step	Task
1.	Open the four hinges on each door 
2.	Remove the doors at both ends of the box
3.	Place the front door against the rear edge of the pallet. The front door can be used as a ramp.  **Be sure to place the ramp (front door) as illustrated here.** 
4.	Carefully remove the accessory box, and any other items, including the wooden shelf above the scanner's keyboard and all the filling material, from the wooden box.
5.	Press once on the swivel lock to release the brake. 
Caution: Two people are needed in the next step due to the weight of the equipment.	
6.	Carefully move the scanner out of the wooden box, down the ramp.
7.	Remove the clear plastic (wrapped around the scanner) from the unit.

Section 3-4
Preparing for Installation

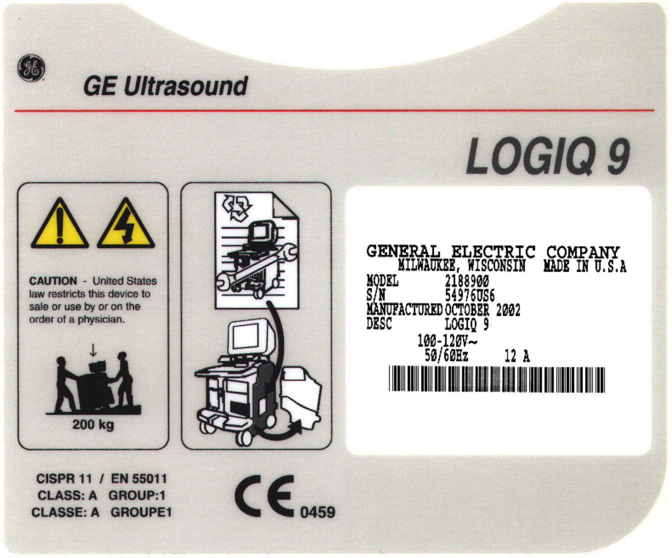
3-4-1 Verify Customer Order

Compare items received by the customer to that which is listed on the delivery order. Report any items that are missing, back ordered or damaged.

3-4-2 Physical Inspection

3-4-2-1 System Voltage Settings

Verify that the scanner is set to the correct voltage.
The Voltage settings for the LOGIQ™ 9 Scanner is found on a label to the right of the Power switch and External I/O, on the rear of the system.


GE Ultrasound
LOGIQ 9
CAUTION - United States law restricts this device to sale or use by or on the order of a physician.
200 kg
CISPR 11 / EN 55011
CLASS: A GROUP:1
CLASSE: A GROUPE1
CE 0459

GENERAL ELECTRIC COMPANY
MILWAUKEE, WISCONSIN MADE IN U.S.A
MODEL 2188900
S/N 54976US6
MANUFACTURED OCTOBER 2002
DESC LOGIQ 9
100-120V~
50/60Hz 12 A

Figure 3-2 Rating Plate Example

WARNING ***CONNECTING A LOGIQ™ 9 SCANNER TO THE WRONG VOLTAGE LEVEL WILL MOST LIKELY DESTROY THE SCANNER.***

3-4-2-2 Video Formats

Check that the video format is set to the locally used video standard, NTSC or PAL.

3-4-3 EMI Protection

This unit has been designed to minimize the effects of Electo-Magnetic Interference (EMI). Many of the covers, shields, and screws are provided primarily to protect the system from image artifacts caused by this interference. For this reason, it is imperative that all covers and hardware are installed and secured before the unit is put into operation.

Section 3-5
Completing the Installation

3-5-1 Power On / Boot Up

NOTE: *After turning off a system, wait at least ten seconds before turning it on again. The system may not be able to boot if power is recycled too quickly.*

3-5-1-1 Scanner Power On

1.) Connect the Power Cable to the back of the system.
2.) Ensure the Cable Clip slips securely over the shoulders on the molded plug.
3.) Connect the Main Power Cable to a hospital grade power receptacle with the proper rated voltage. Never use an adapter that would defeat the safety ground.
4.) Switch ON the Circuit Breaker at the rear of the system.

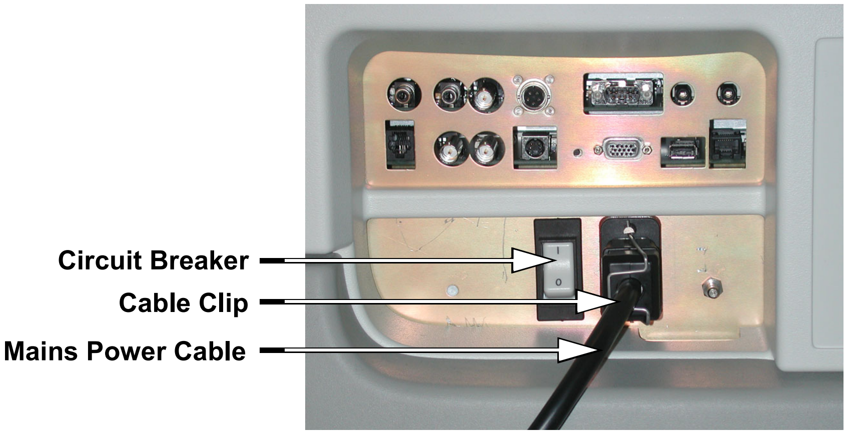


Figure 3-3 Circuit Breaker and Power Cable on Back of Scanner

When power is applied to the scanner and the rear Circuit Breaker is turned ON, power is distributed to the Cooling Unit, Control Panel, Monitor, Internal and External I/O Boards, Peripherals and the Back-end Processor.

⚠ **NOTICE** When AC power is applied to the scanner, the **Standby** switch on the Control panel illuminates amber, indicating the Back End Processor is in standby mode.

3-5-1-2 Back-end Processor Boot Up

Press the **Standby** switch on the Control Panel once.

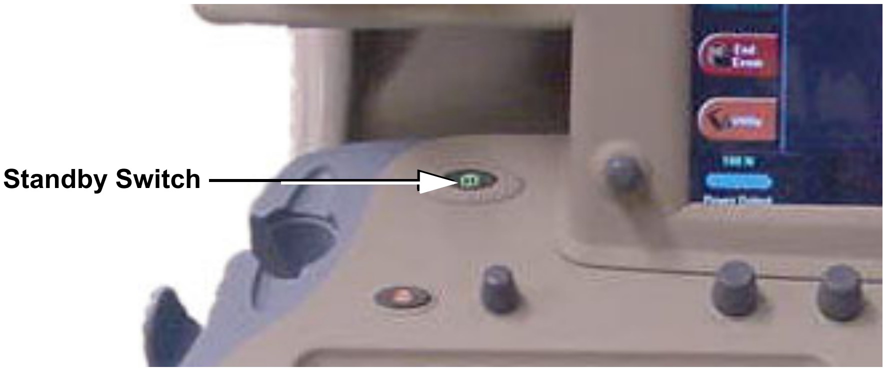


Figure 3-4 Standby Switch for Back-end Processor Boot Up

When the **Standby** switch on the Control Panel is pressed once, the Back-end Processor starts and the software code is distributed to initiate the scanner.

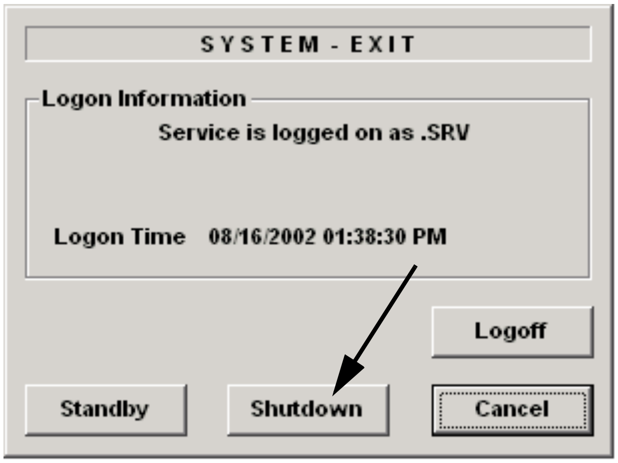
No status messages are displayed during this process.

3-5-2 Power Off/ Shutdown

NOTE: *After turning off a system, wait at least ten seconds before turning it on again. The system may not be able to boot if power is recycled too quickly.*

3-5-2-1 Back-end Processor Power Down

1.) Press the **Standby** switch on the Control Panel once to display the SYSTEM - EXIT menu.
2.) Select Shutdown from the SYSTEM - EXIT menu.



SYSTEM - EXIT

Logon Information

Service is logged on as .SRV

Logon Time 08/16/2002 01:38:30 PM

Figure 3-5 System Exit Menu for Back-end Processor Power Down

3-5-2-2 Scanner Shutdown

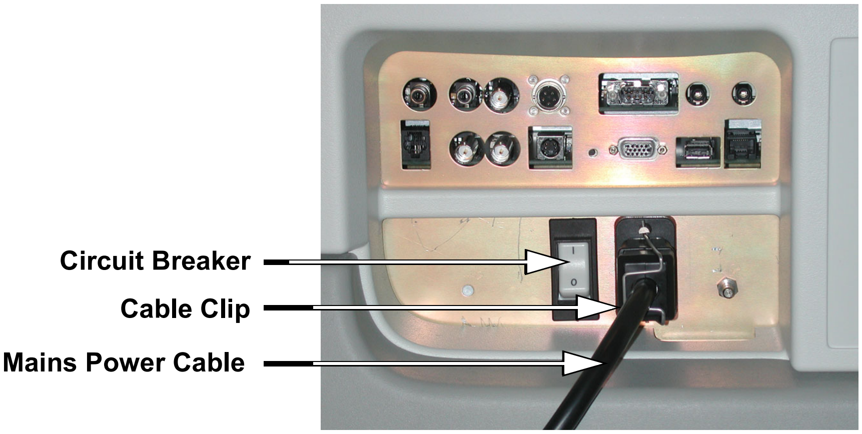


Figure 3-6 Circuit Breaker and Power Cable on Back of Scanner

1.) Switch OFF the Circuit Breaker at the back of the system.

2.) Disconnect the Mains Power Cable is necessary. *For example:* Relocating the scanner.

⚠ **NOTICE** Disconnecting the Mains Power Cable *before* switching OFF the Circuit Breaker will activate the uninterruptible power system (UPS) in the backend processor, forcing an ordered shutdown of the system.

⚠ **NOTICE** The UPS serves *only* as a battery backup that allows for a soft shut-down of the scanner to prevent file corruption. **IT DOES NOT REGULATE INCOMING VOLTAGE**.

3-5-3 Transducer Connection

1.) Connect a transducer to one of the three rightmost transducer receptacle as follows:

    A.) Ensure that the transducer twist lock lever to the horizontal position.

    B.) Insert the transducer connector on the receptacle guide pin until it touches the receptacle mating surface.

    C.) Twist the transducer twist lock lever to vertical position to lock it in place. Twist the lever to the horizontal position to disconnect the transducer.

NOTE: It is not necessary to turn OFF power to connect or disconnect a transducer.

Section 3-6
System Configuration

3-6-1 System Specifications

3-6-1-1 Physical Dimensions Physical Dimensions of

The physical dimensions of the LOGIQ™ 9 unit are summarized in Table 3-1 and Table 3-2.

Table 3-1 lists the size of LOGIQ™ 9, with monitor and on-board peripherals.

Table 3-1 Physical Dimensions of LOGIQ™ 9

Height		Width	Depth
Minimum	Maximum		
140.3 cm / 55.25 inches	160.7 cm / 63.25 inches	64 cm / 25.2 inches	89.9 cm / 35.4 inches

3-6-1-2 Weight without Monitor and Peripherals

Table 3-2 Weight of LOGIQ™ 9 With Monitor and Without Other Peripherals

Model	Weight [kg]	Weight [lbs.]
LOGIQ™ 9	196.8	434

3-6-1-3 Acoustic Noise Output:

Less than 70dB(A) according to DIN 45635 - 19 - 01 - KL2.

3-6-2 Electrical Specifications

Table 3-3 Electrical Specifications for LOGIQ™ 9

Voltage	Tolerances	Current	Frequency
100-120 VAC	±10%	9.5 A	50-60 Hz
200-240 VAC	±10%	4.75 A	50-60 Hz

3-6-3 On-Board Optional Peripherals

Table 3-4 Approved Peripherals

Device	Manufacturer	Model	Video Signal
B/W Video Printer	SONY	UP-895MDW	NTSC/PAL
Video Cassette Recorder	SONY	SVO-9500MD SVO-9500-MDP	NTSC PAL
Video Cassette Recorder	Panasonic	AG-MD835 AG-MD835P AG-MD835E	NTSC NTSC PAL

NOTE: There are no external peripheral options for the LOGIQ™ 9

3-6-4 External I/O Connector Panel

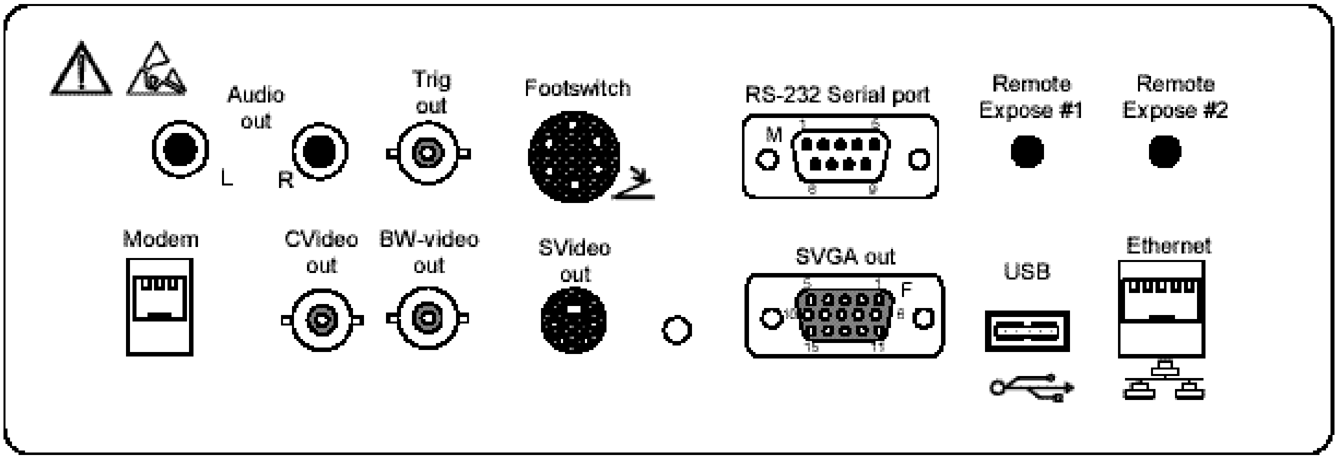


Figure 3-7   External I/O Panel Labels

.i.External I/O Connector Panel;

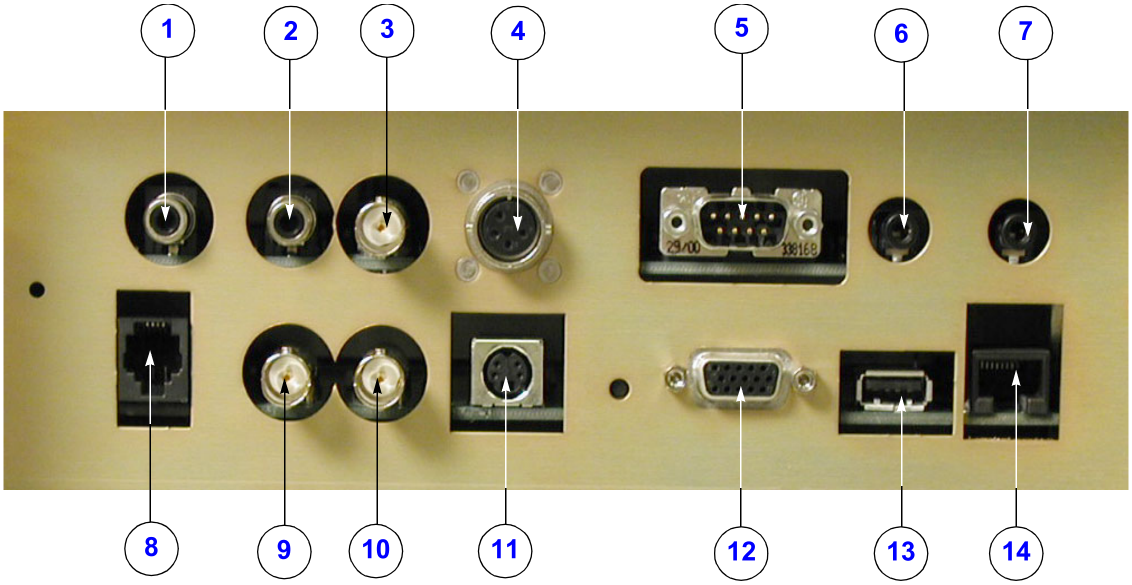


Figure 3-8   External I/O Panel Connectors

3-6-4External I/O Connector Panel (cont'd)

Table 3-5 External I/O Connector Descriptions

Item	Connector Name	Table Number	Description		
1	Audio Output (Left)		RCA Phono Jack		
2	Audio Output (Right)		RCA Phono Jack		
3	Trigger Output		BNC Connector		
4	Footswitch	Table 3-12	Hirose Electric Co. RM12BRB-5S, Footswich transport shelf is in the back at the bottom		
5	RS232 Com1		DSUB 9 pin male		
6	Expose 1	Table 3-11	Mini-phone Jack		
7	Expose 2	Table 3-11	Mini-phone Jack		
8	Modem Connection	Table 3-10	RJ-11 with global adapter kit for connection		
9	Composite Video Out		BNC Connector, Color Output		
10	B/W Video Out		BNC Connector, Black and White Output		
11	S-Video Output	Table 3-6	4 pin mini-DIN		
12	S-VGA Output	Table 3-7	DSUB-HD22 15 Pin female		
13	USB (1)	Table 3-8	USB-A, Used for Service Dongle		
14	Ethernet Connection	Table 3-9	RJ-45 Connector		

3-6-4-1 External I/O Pin Outs

Table 3-6 S-Video Connector, 4 Pin

Pin No	Output Signal	Description
1	SVIDEO OUT/IN YG	Y (Luma) GND
2	SVIDEO OUT/IN CG	C (Chroma) GND
3	SVIDEO OUT/IN Y	Y (Luma) SIGNAL
4	SVIDEO OUT/IN C	C (Chroma) SIGNAL

Table 3-7 S-VGA Connector, Shrinked Sub-D 15 Pin

Pin No	Output Signal	Description
1	VGA OUT1 R	Red
2	VGA OUT1 G	Green
3	VGA OUT1 B	Blue
4, 9,11,12,15	N/C	N/C
5, 6, 7, 8, 10	GND	GND
13	VGA OUT1 HS	H Sync
14	VGA OUT1 VS	V Sync

Table 3-8 USB (A) Connector

Pin No	Output Signal	Description
1	VCC	USB Power Supply
2	- Data	USB Data (-)
3	+ Data	USB Data (+)
4	GND	USB Power Ground

Table 3-9 Ethernet Connector, RJ45 Modular 8 Pin

Pin No	Output Signal	Description
1	ETHER TD	Ethernet RD+
2	ETHER TD	Ethernet RD-
3	ETHER RD	Ethernet TD+
6	ETHER RD	Ethernet TD-
Others	NC	Non-connection

3-6-4-1External I/O Pin Outs (cont'd)

Table 3-10 Modem, RJ11 Modular 6 Pin

Pin No	Output Signal	Description
2	TEL L4	Telephone L4
3	TEL L2	Telephone L2
4	TEL L1	Telephone L1
5	TEL L3	Telephone L3
Others	NC	Non-connection

Table 3-11 Remote Expose 1 & 2 Connectors

Pin No	Output Signal	Description
1	SHUTTER/PRINT	
2	Signal GND	

Table 3-12 Footswitch Connector

Pin No	Output Signal	Description
1	Foot 1	
2	Floating Ground	
3	Foot 2	
4	Floating Ground	
5	Foot 3	

3-6-5 Video Specification

Video specifications may be needed to be able to connect laser cameras or other devices to the LOGIQ™ 9.

Table 3-13 Video Specifications

Timing Parameter	1024x768 75Hz	768x576 50Hz	640x480 60Hz	800x600 60Hz	800x600 75Hz	1024x768 60Hz
Horizontal Rate [kHz]	60.02	31.25	31.47	37.88	46.88	48.36
Horizontal Period [µs]	16.66	32.00	31.78	26.40	21.33	20.68
Pixel Clock [MHz]	78.75	29.50	24.55	40.00	49.50	65.00
H Blank Width [µs]	3.66	5.97	5.70	6.40	5.17	4.92
H Sync Width [µs]	1.22	2.34	2.36	3.20	1.62	2.09
H Front Porch [µs]	0.20	0.75	0.73	1.00	0.32	0.37
Active Horizontal Period [µs]	13.00	26.03	26.07	20.00	16.16	15.75
Vertical Rate [Hz]	75.03	50.00	59.94	60.32	75.00	60.00
Vertical Period [ms]	13.33	20.00	16.68	16.58	13.33	16.67
V Sync Width [lines=ms]	32=0.53	49=1.57	45=1.43	28=0.74	25=0.53	38=0.79
V Front Porch [lines=µs]	3=50.00	5=160.00	6=190.70	4=105.60	3=64.00	6=124.10
Equalization Gate [lines=µs]	1=16.66	5=160.0	6=190.7	1=26.4	1=21.3	3=62.00
Lines: Field/Frame	800	625/625	525/525	628	625	806
Active Lines/Frame	768	576	480	600	600	768

Section 3-7
Available Probes

See Specifications in the LOGIQ™ 9 User Reference Manual for probes and intended use.

See ***Chapter 9 - Renewal Parts****,* for part numbers to be used when ordering new or replacement probes.

Section 3-8
Software/Option Configuration

Refer to the LOGIQ™ 9 Basic User Manual, Chapter 16, Customizing Your System for information on configuring items like Hospital, Department, Language, Units (of measure), Date, Time and Date Format.

For information on configuring Software Options, Refer to the LOGIQ™ 9 Basic User Manual, Chapter 16, Customizing Your System.

For information on configuring DICOM Connectivity, Refer to the LOGIQ™ 9 Basic User Manual, Chapter 16, Customizing Your System.

Section 3-9
Connectivity Installation Worksheet

Site System Information

Site:

Floor:

Comments:

Dept:

Room:

LOGIQ SN:

Type:

REV:

CONTACT INFORMATION

Name	Title	Phone	E-Mail Address

TCP/IP Settings

Name - AE Title:

IP Settings

IP Address:
Subnet Mask:
Default Gateway:

Remote Archive Setup

Remote Archive IP:
Remote Archive Name:

Services (Destination Devices)

	Device Type	Manufacturer	Name	IP Address	Port	AE Title
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Section 3-10
Insite IP Address Configuration

This information needed to facilitate the OnLine Center engineers in connecting to the system is found in the InSite Installation Manual, 2324712-100.

Section 3-11
Before Starting a Software Upgrade

3-11-1 Printers

In R2.1.0 software and greater, if the customer has an HP990, HP970, UP-D50, UP-D895, UP-D21 or Talley printers, any settings they have made in the device driver, such as Gray Scale Images, will be lost. These printer settings will need to be recorded. You need to go to Utilities>Periperals>Printers in order to record the printer settings.

3-11-2 Save Connectivity Settings

NOTE: ***DICOM TCPIP settings should not be deleted with the Base Image Load due to the use of upgrade scripts. However, It may be helpful to record this settings before proceeding in case an error occurs in the loading of software.***

NOTE: *DICOM Workflows and DICOM Device Configurations are on the "D:" drive and will be saved when User Defined Cohfigurations are saved.*

If you want to Import exams back on to your system after the FMI, you should record any vital DICOM data before proceeding with this FMI or upgrading software.

1.) Select Utilities>Connectivity>TCPIP tab and record all information on that tab with particular attention to:
    - The "Enable DHCP" box should **NOT** be checked
    - Computer Name: ______________________________
    - IP-Address: ______/________/_________/_________
    - Subnet Mask: ______/________/________/________
    - Remote Archive IP-Address: ______/________/_________/_________
    - Remote Archive Name: ______________________________________

If the system has been Insite enabled, open the Service Diagnostic Interface and record InSite IP Address settings.

2.) Select the "Wrench" Icon. Log in as GE Service using the current password.
3.) Select *Utilities>iLinq Configuration Utility>Accept (3 times)>InSite Checkout* tab
4.) Record the Insite IP Address: _________/__________/__________/_________ and
Unlabeled IP Address: __________/___________/__________/_________
    - In the unlabeled IP Address line enter the System IP Address. This may be either the one obtained from the hospital administrator or if the system is not on a network it would be the factory default address. This address can also be found in the *System>Connectivity>TCP/IP* Tab
5.) Select *the Device Connection* Tab and record:
CPU Serial Port Name ____________________ CPU Serial Port Speed ____________________
6.) Select *Exit* in the Device Connection screen.
7.) Select *OK* in the Exit Confirmation window.
8.) Close the Netscape Diagnostic window.

WARNING *The next steps will destroy ALLdata on the Scanner*

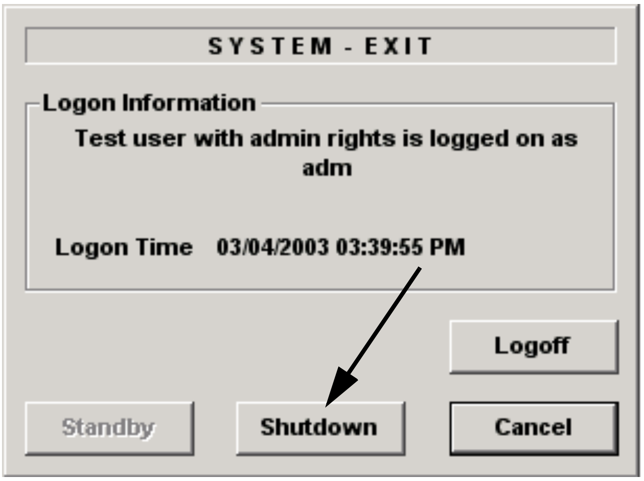
Section 3-12
Loading Base Image Software

NOTE: *While it is believed to be unnecessary, It would not hurt to disconnect the system from the network and remove all transducers.*

NOTE: *If the user has an HP990, HP970, UP-D50, UP-D895, UP-D21 or Talley printers, connect the printer and turn it on. If a printer is plugged in at this time it will automatically install and you won't have to go back to windows to install it.*

NOTE: *If the system has any digital peripherals, be sure that they are turned on.*

1.) Insert the disk labeled "Base System Software Load Image" into the CDROM drive.
2.) Properly turn off the scanner by momentarily pressing the Standby (ON/OFF) Switch. Select Shutdown from the System Exit menu. Wait for the Standby Switch to turn amber.
3.) If the system will not shutdown normally, hold down the Standby Switch until the light turns from green to amber.


SYSTEM - EXIT

Logon Information

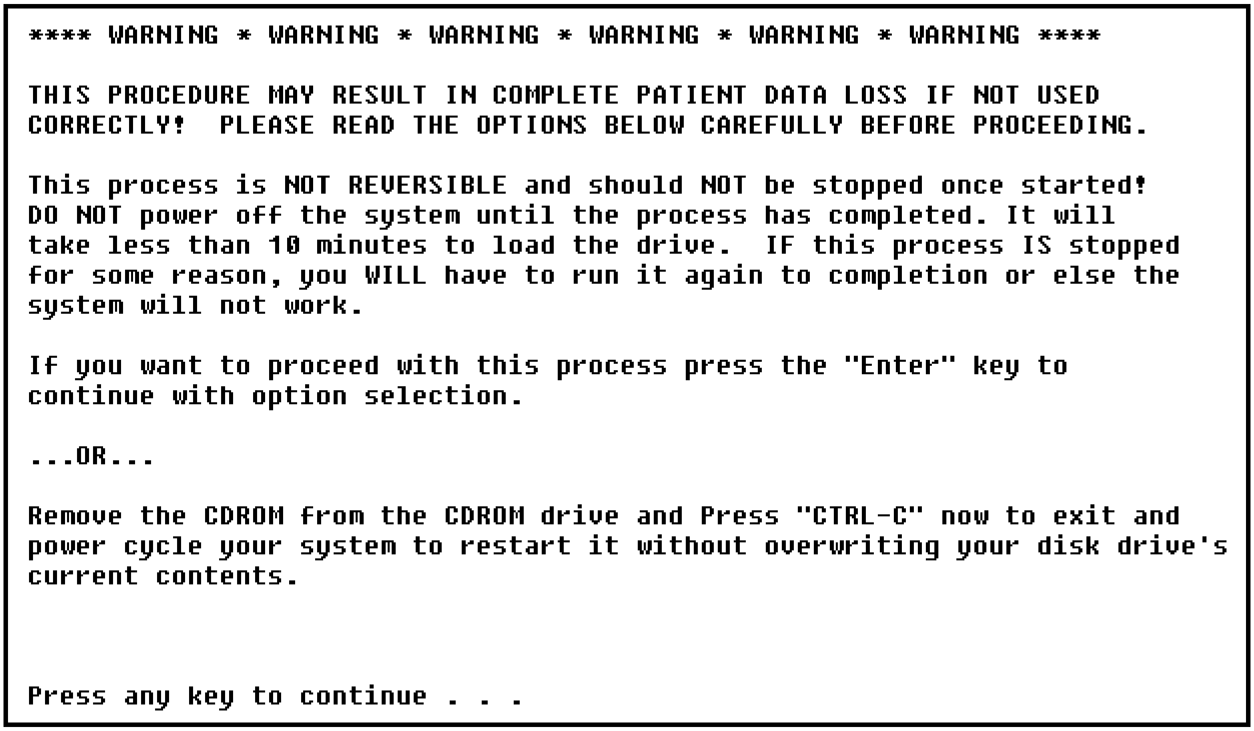
Test user with admin rights is logged on as adm

Logon Time 03/04/2003 03:39:55 PM

Figure 3-9 Shutdown Dialog Box

4.) Turn on the scanner. You will see a message displayed on the Touch Panel screen as shown in Figure 3-10 on page 3-19 .

Section 3-12 Loading Base Image Software (cont'd)



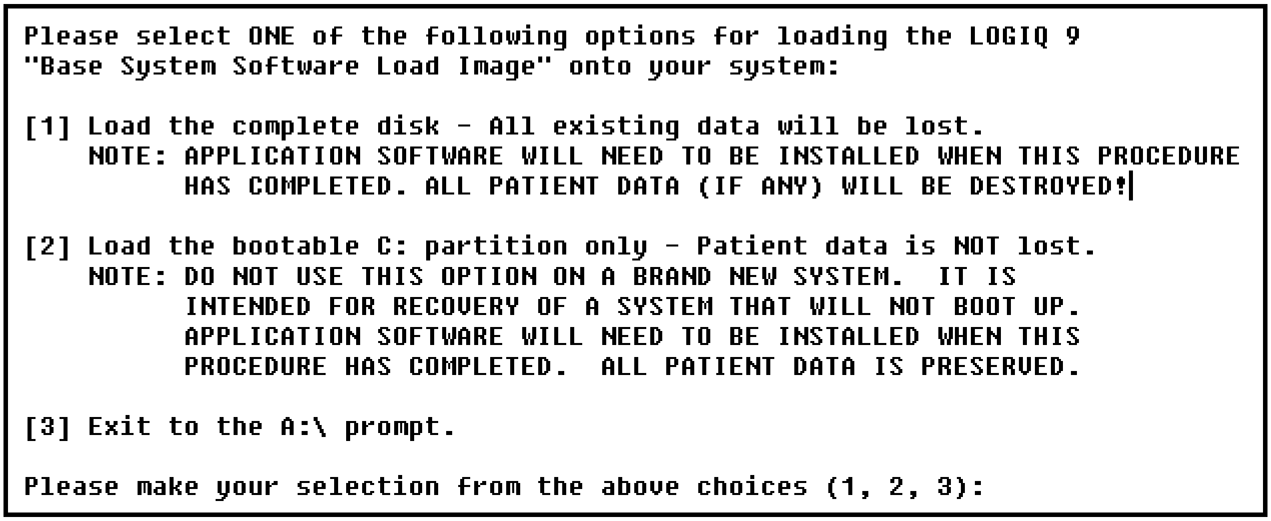
```
**** WARNING * WARNING * WARNING * WARNING * WARNING * WARNING ****

THIS PROCEDURE MAY RESULT IN COMPLETE PATIENT DATA LOSS IF NOT USED
CORRECTLY!  PLEASE READ THE OPTIONS BELOW CAREFULLY BEFORE PROCEEDING.

This process is NOT REVERSIBLE and should NOT be stopped once started!
DO NOT power off the system until the process has completed. It will
take less than 10 minutes to load the drive.  IF this process IS stopped
for some reason, you WILL have to run it again to completion or else the
system will not work.

If you want to proceed with this process press the "Enter" key to
continue with option selection.

...OR...

Remove the CDROM from the CDROM drive and Press "CTRL-C" now to exit and
power cycle your system to restart it without overwriting your disk drive's
current contents.



Press any key to continue . . .
```

Figure 3-10 Base Load Warning Message

Now is your chance to abort the Base Image load or continue.

5.) Press any key to continue. To abort, remove the CD-ROM from the drive and press **CTRL-C**.

Section 3-12 Loading Base Image Software (cont'd)



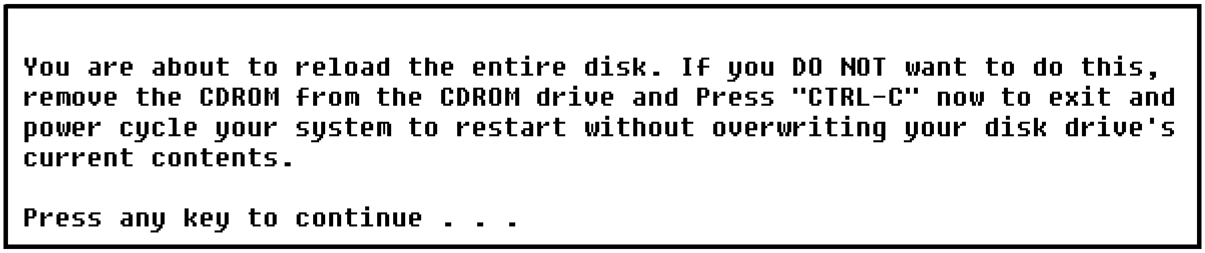
```
Please select ONE of the following options for loading the LOGIQ 9
"Base System Software Load Image" onto your system:

[1] Load the complete disk - All existing data will be lost.
    NOTE: APPLICATION SOFTWARE WILL NEED TO BE INSTALLED WHEN THIS PROCEDURE
          HAS COMPLETED. ALL PATIENT DATA (IF ANY) WILL BE DESTROYED!

[2] Load the bootable C: partition only - Patient data is NOT lost.
    NOTE: DO NOT USE THIS OPTION ON A BRAND NEW SYSTEM.  IT IS
          INTENDED FOR RECOVERY OF A SYSTEM THAT WILL NOT BOOT UP.
          APPLICATION SOFTWARE WILL NEED TO BE INSTALLED WHEN THIS
          PROCEDURE HAS COMPLETED.  ALL PATIENT DATA IS PRESERVED.

[3] Exit to the A:\ prompt.

Please make your selection from the above choices (1, 2, 3):
```

Figure 3-11 Base Load Option Screen

The first choice is to load the complete hard drive.

1.) Load the complete disk - All existing data will be lost.

NOTE: APPLICATION SOFTWARE WILL NEED TO BE INSTALLED WHEN THIS PROCEDURE HAS COMPLETED. ALL PATIENT DATA (IF ANY) WILL BE DESTROYED!



```
You are about to reload the entire disk. If you DO NOT want to do this,
remove the CDROM from the CDROM drive and Press "CTRL-C" now to exit and
power cycle your system to restart without overwriting your disk drive's
current contents.

Press any key to continue . . .
```

Figure 3-12 Base Load Option 1 Message

Figure 3-12 is the last warning message before the complete base load process begins. Press any key to continue or abort by pressing **CTRL-C**.

Section 3-12 Loading Base Image Software (cont'd)

The second choice is to load only the bootable portion of the hard drive partition, the "C" partition. This is not an option for a new hard drive that has not been previously partitioned for proper LOGIQ 9 operation.

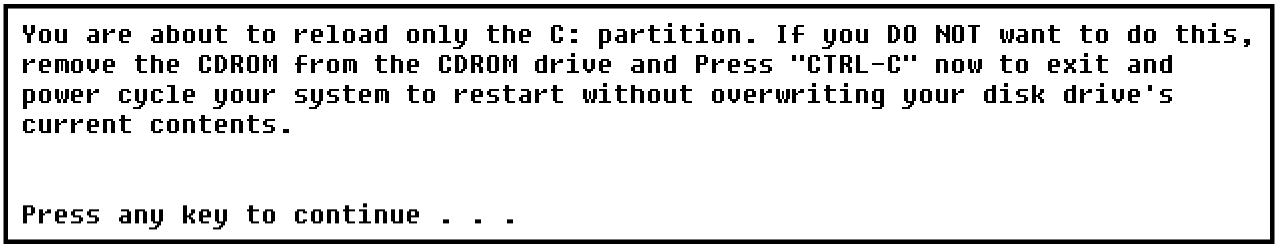
2.) Select [2} Load the bootable C: partition only - Patient data is NOT lost.

NOTE: *DO NOT USE THIS OPTION ON A BRAND NEW SYSTEM. IT IS INTENDED FOR RECOVERY OF A SYSTEM THAT WILL NOT BOOT UP. APPLICATION SOFTWARE WILL NEED TO BE INSTALLED WHEN THIS PROCEDURE HAS COMPLETED. ALL PATIENT DATA IS PRESERVED.*

This selection will leave the remaining drive partitions intact.

Table 3-14 LOGIQ 9 Drive Partition and Usage

Drive Partition	Usage
C	System Files and Applications
D	User Define and Presets
E	Patient Archive Data
F	File Swap Area



```
You are about to reload only the C: partition. If you DO NOT want to do this,
remove the CDROM from the CDROM drive and Press "CTRL-C" now to exit and
power cycle your system to restart without overwriting your disk drive's
current contents.


Press any key to continue . . .
```

Figure 3-13 Base Load Option 2 Message

Figure 3-13 is the last warning message before the base load process begins. Press any key to continue or abort by pressing **CTRL-C**.

The third choice,

3.) Exit to the A:\ prompt. Is intended for manufacturing use only.

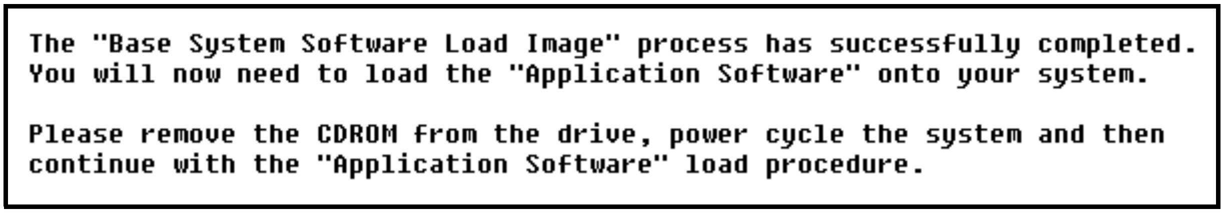
This is **NOT** an option as it is intended for manufacturing use only.

If you select Option 3 by mistake, power cycle the system. Hold down the Standby switch until the light turns amber then turn the system back on.

Section 3-12 Loading Base Image Software (cont'd)

Once you have chosen to continue with Option 1 or Option 2, you will see a screen showing Norton Ghost. This automatically loads a base set of software onto the hard disk. Let it run to completion (Approximately 8-10 mins).

A message, as shown in Figure 3-14, will be displayed when the process is complete.



```
The "Base System Software Load Image" process has successfully completed.
You will now need to load the "Application Software" onto your system.

Please remove the CDROM from the drive, power cycle the system and then
continue with the "Application Software" load procedure.
```

Figure 3-14 Base Load Complete

NOTE: *IMPORTANT ... With the clinical version of Base Image Software you will see an error message "Not Ready Error Reading from Drive A" Ignore this message and continue.*

4.) Remove the CD-ROM

NOTE: *Remove the CD-ROM from the drive; otherwise you will be repeating the Base System Software Load process when the system boots up.*

5.) After removing the CDROM from the drive, properly turn off the scanner by holding down the Standby Switch until the light turns amber.

6.) Turn the scanner back on. It will now boot up and automatically log on to start checking hardware and mapping disk drives. This is a normal and should be allowed to run to completion.

NOTE: ***While the script is running, several windows or dialog boxes will appear on the screen. At times it may look like the system is unresponsive. Wait for the "System Settings Change"dialog box "Do You Want to Restart computer now" to appear, approximately 3-4 minutes after the desktop is displayed.***

NOTE: ***Prior to the System Settings Change dialog box, Do NOT touch the system during this process. Activating the keyboard, mouse or front panel could corrupt the installation.***

7.) When you get a message to restart Windows, select YES.

8.) Allow the system to reboot.

9.) The system will come up into the Windows mode.

Section 3-12 Loading Base Image Software (cont'd)

3-12-1 System Checks

1.) From the Windows mode display, double-click (**RIGHT SET** key) on the My Computer icon.
2.) Check the drive letter assignments for the Compact Disk and Removable Disk. They should be Compact Disk (G) and Removable Disk (H).
3.) If the Drive letter assignments are properly mapped, proceed to loading applications software. If the assignments are reversed, proceed to remap the drives manually.
4.) If the customer has a **USB (Digital Priters)** to be install, plug it in now. The system is still in Windows mode and should recognize the printer and install the necessary driver. If you do not install the printer until after the Applications software has been loaded, you will need a service dongle to get into windows and manually install the printers. Print a test page to check the printer installation.

NOTE: If the printer is installed while in application mode, excessive CPU time will be consumed and the system will become very slow to unusable. Shutting down and rebooting will clear the condition. The printer will function correctly.

5.) Check your Service Dongle. Plug in your Service Dongle to ensure that it is recognized and lights up.

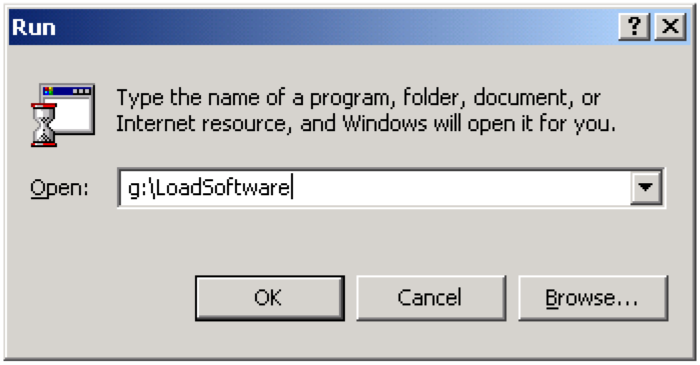
Section 3-13
Loading Application Software

3-13-1 Loading Applications Software

NOTE: *If you have not done so previously, double-click on the My Computer icon. Check for the drive letters assignments of the Removable Drive (MOD) and the CD-ROM Drive. If the CD-ROM Drive is not drive “g” and the MOD drive “h” , manually remap the drives.*

NOTE: *When installing R2.1.1 software you may see error messages about not being able to replace the following *.dll files: **ginastub.dll** and **msvcr70.dll**. These are known, non-critical issues that are being tracked and will be fixed in the next revision of software.*

1.) Place the “Application Software” CDROM into the CDROM drive.
2.) Select the START button on the tool bar at the bottom of the LCD screen and select “**Run…**”.
3.) Enter “**g:\LoadSoftware**” into the dialog box as shown in Figure 3-15.



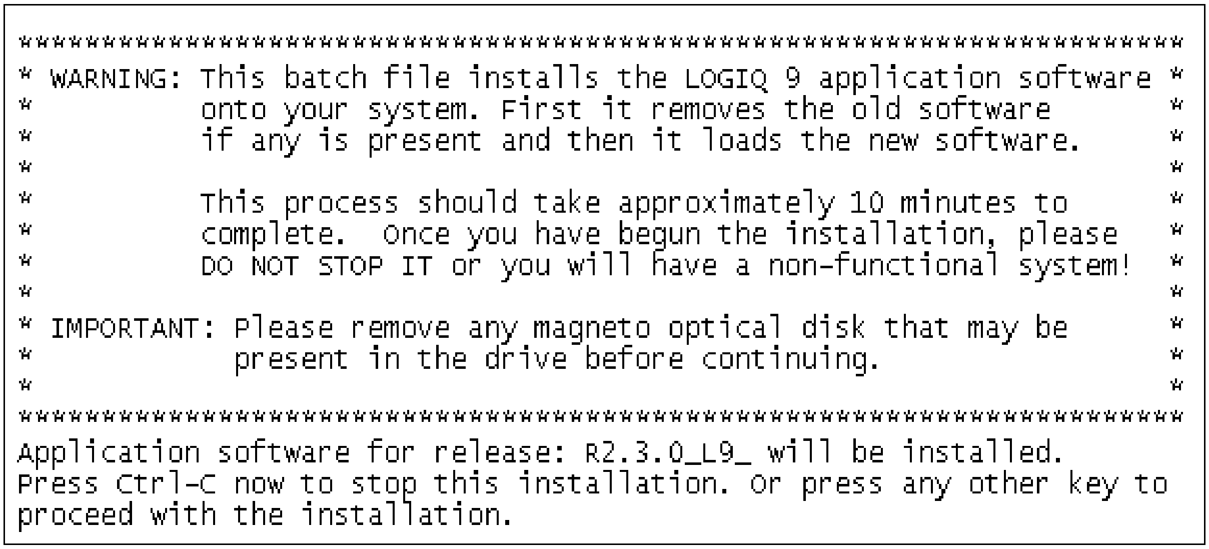
Type the name of a program, folder, document, or Internet resource, and Windows will open it for you.

Open: g:\LoadSoftware

Figure 3-15 Run Load Software

4.) You will see a screen that warns you that you are about to load software, press the Enter key or select OK to start the process.
5.) You will see a Command (CMD) window open as shown in Figure 3-16.

3-13-1Loading Applications Software (cont'd)

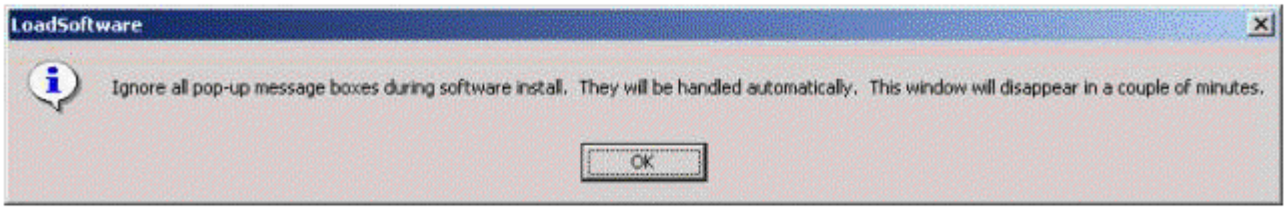


```
**********************************************************************
* WARNING: This batch file installs the LOGIQ 9 application software *
*          onto your system. First it removes the old software       *
*          if any is present and then it loads the new software.     *
*                                                                    *
*          This process should take approximately 10 minutes to      *
*          complete.  Once you have begun the installation, please   *
*          DO NOT STOP IT or you will have a non-functional system!  *
*                                                                    *
* IMPORTANT: Please remove any magneto optical disk that may be      *
*            present in the drive before continuing.                 *
*                                                                    *
**********************************************************************
Application software for release: R2.3.0_L9_ will be installed.
Press Ctrl-C now to stop this installation. Or press any other key to
proceed with the installation.
```

Figure 3-16 Command Window

6.) As indicated, press any key to continue. The process is completely automated and provides you with messages as to its status. R2.1.1 Software provides the message in Figure 3-17.

At this point you just have to wait while the software loads (Approximately 7-8 minutes).



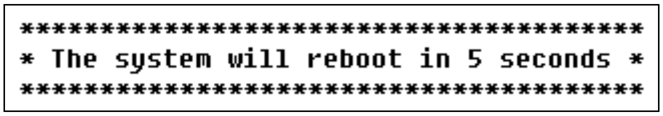
Ignore all pop-up message boxes during software install. They will be handled automatically. This window will disappear in a couple of minutes.

Figure 3-17 R2.1.1 Software Message

NOTE: *When the Information Window appears asking you to select OK, do nothing. This window will disappear automatically.*

3-13-1Loading Applications Software (cont'd)

7.) When the process has completed, the window will turn dark red and you will see the following message in Figure 3-18.



```
****************************************
* The system will reboot in 5 seconds *
****************************************
```

Figure 3-18 Software Load Complete

8.) When it completes loading the system will reboot.

If possible while the system is rebooting remove the CD from the drive. If the CD is remove the system will automatically reboot into the applications software.

If you didn't remove the CD, don't worry you will get a dialog box as in Figure 3-19.

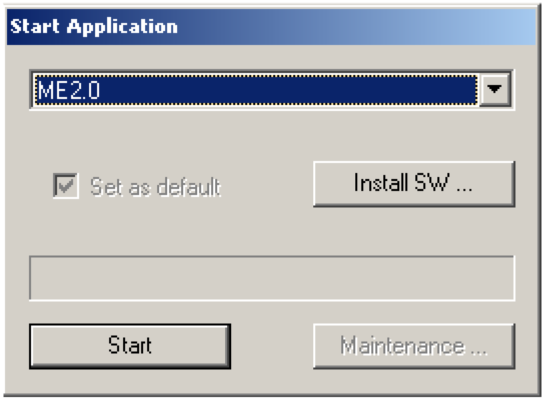


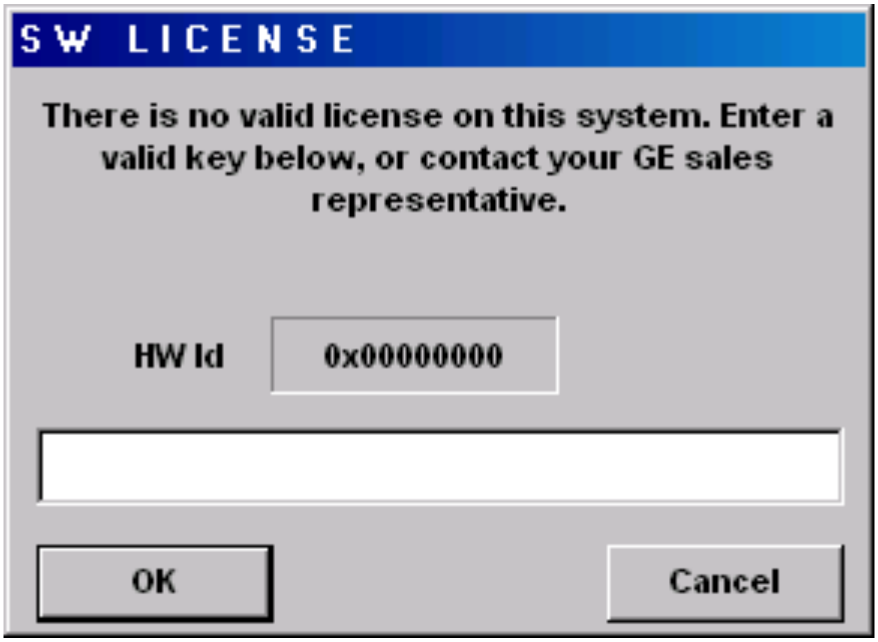
Figure 3-19 Start Software

9.) REMOVE the Applications CD

10.) From the Start Applications dialog box, select START.

11.) Select CANCEL.

3-13-1Loading Applications Software (cont'd)



SW LICENSE

There is no valid license on this system. Enter a valid key below, or contact your GE sales representative.

HW Id: 0x00000000

Figure 3-20 Enter Option String

12.) During the reboot process, the system may ask for the option string (valid license) to be entered. If this is necessary it will be included in the installation paperwork.

NOTE: *Starting with R3.x Software, all systems must have at least the basic option string in order for the software to run. Any single option string may enable multiple options (i.e. Basic & B-Flow).*

Demo option strings turn on all options for a limited period of time. Do Not leave a demo option string in a unit when it is sold to a customer. The current R3.x Demo Option String expires 31 January, 2005.

Section 3-14
System Setup

3-14-1 To Complete the System Setup

1.) From the Touch Screen on the scanner, select *Utility>Connectivity>TCPIP Tab*.

2.) Ensure that DHCP is deselected so you can enter information manually.

3.) Input the DICOM information.

  * This should be the appropriate DICOM information for the system if it is on the hospital network. If it is not correct, input the correct data.

4.) After all information is entered select SAVE SETTINGS.

5.) If the system is **NOT** on a network you will need to input a set of "dummy" data for proper InSite and Diagnostic operation. Enter the following data if you are not on a network:

  * Computer Name:
  * IP Address: 3.192.28.253
  * Subnet Mask: 255.255.255.0

6.) After all information is entered select SAVE SETTINGS.

7.) iLinq Checkout will need to be completed again. refer to the iLinq Installation Manual.

3-14-2 VCR Setup

1.) Reset the VCR and choose a Default Line Printer by going to *Utilities>System>Peripherals*.

2.) Under VCR, Select *Sony 9500 VCR* and SAVE

3.) Under SETUP, Select the desired default line printer and SAVE

4.) Select *Exit* in the lower left-hand corner of the Touch Screen.

3-14-3 Printer Setup

1.) If the customer has a **USB (Digital) Printer** plug it in now. The system is in Windows mode it should recognize the printer and install the necessary driver.

2.) If you do not install the printer until after the Applications software has been loaded, you will need a service dongle to get into windows and follow the manual set up procedures in the LOGIQ™ 9 Peripheral Installation Manual 2341053-100.

3-14-4 Print Key Assignment and Checkout

Because of the addition of more printer choices, digital and analog, the factory default print key configuration has been removed for the color and b/w printers.

1.) Determine which printers are configured on the system. The former factory defaults were Color = P3 and B/W = P2.

2.) Consult the customer to ensure which “Print” keys (P1-4) should be assigned to printers.

3.) Select Utility > Admin > Connectivity > Buttons >. Choose the desired print button. Under “Destinations”, select necessary printer choice from the drop-down list.

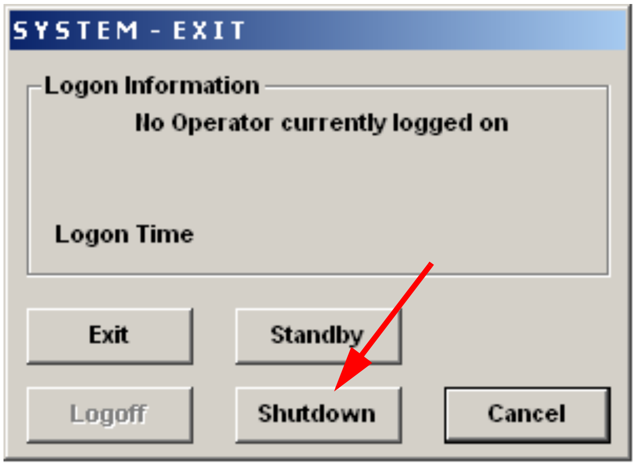
4.) Press the print key just configured and you should get a printout of the screen.

3-14-5 Restore Patient, Report, and User-Defined Presets

1.) Place the Backup/Restore media (MOD or CD-R) in the drive.
2.) Select the UTILITY tab on the Touch Panel. Select SYSTEM, then BACKUP/RESTORE.
3.) Select everything under Restore by placing a check mark after Patient Archive, Report Archive, System Configuration, and User Defined Configuration. Then press RESTORE.

3-14-6 Cycle System Power

1.) Do an auto-shut down
2.) Press the **ON/OFF** switch on the Control Panel once to display the SYSTEM - EXIT menu.
3.) Select SHUTDOWN from the SYSTEM - EXIT menu.



No Operator currently logged on

Figure 3-21 System Exit Menu for Back-end Processor Power Down

4.) Power up the system for functional check-out.

Section 3-15
Optional Software Procedures

If everything went well in the software loading process, skip this section.

While system software loading procedures are automatic, the following manual processes are provided in the unlikely event that the automatic process fails or the results are incorrect.

3-15-1 serialno.txt File Creation

With the exception of Demo Systems, if the system serial number is not set correctly the authorized options installed on the customer systems will not function.

Prior to the upgrade there is no way for the systems in the field to record the serial number of the system to the backplane. The *C:\serialno.txt* on the hard drive has been used to record the system serial number up to now.

As part of this FMI the backplane storage code is now available. After an Applications Software Upgrade, when the system is powered up, the *serialno.txt* file will be read from the hard drive and written to the backplane. This will all work well unless:

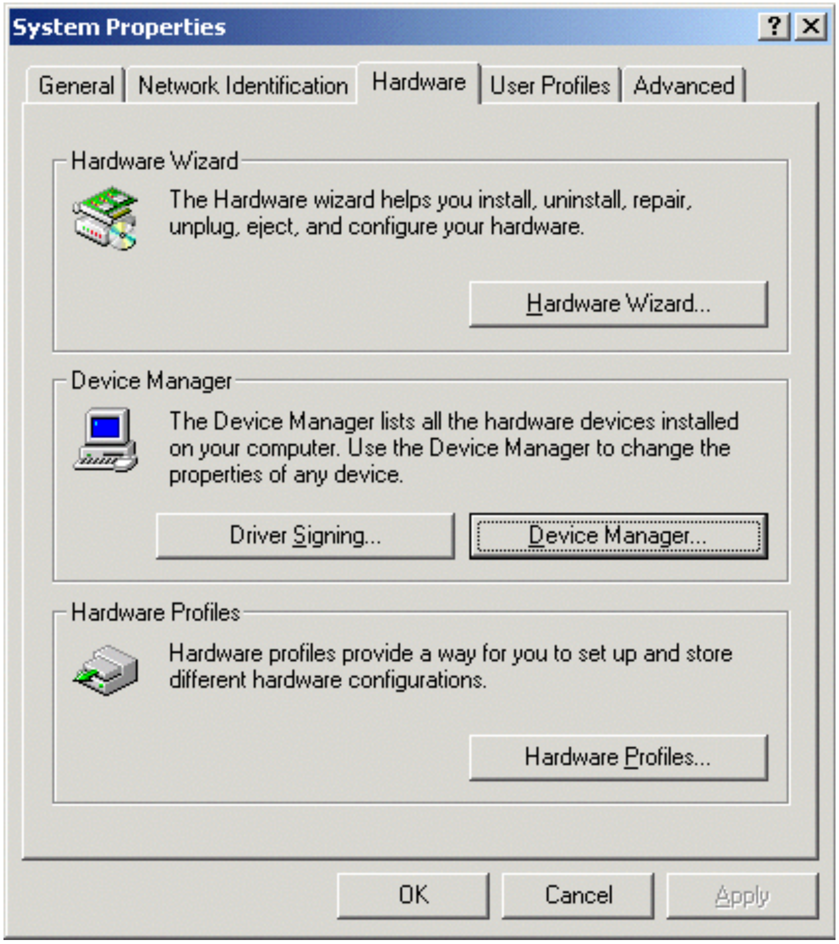
- A system Base Image Software was performed. In this case the serialno.txt file must be created and put back on the "C" drive.
    - Boot up the system with the service dongle attached to the USB port.
    - It will boot up into Windows.
    - Go to Start>Programs>Accessories>Notepad. Use Windows Notepad and type in the serial number of the system. Exactly as it is on the console rating plate. (example: **57493US2**)
    - Check the save path for this text file. Save the file **directly** to the "C:\" drive as file name *serialno.tx*t. It will **NOT** function if saved in any other location.
- There may be a rare case where the *serialno.txt* file does not contain the correct system serial number. If this is the case, repeat the previous steps to edit the *serialno.txt* file to the proper serial number.

NOTE: *If there is any doubt about the contents of serialno.txt, it should be checked before the application is first run, as once the serial number is written into the backplane it can only be changed with a diagnostic.*

The *serialno.txt* file writes it’s information into the Backplane EEPROM. If it is not done during the software load you must use the diagnostic utilities described in Chapter 7 of the Proprietary Manual to enter the Console Serial Number in the EEP-BP VPD Data.txt file.

3-15-2 Optional Check Devices

1.) On the desktop, right click on the MY COMPUTER icon, and select PROPERTIES.
2.) Select the Hardware tab, and then the DEVICE MANAGER. It may take up to a minute for the Device Manager screen to appear.



System Properties

General | Network Identification | Hardware | User Profiles | Advanced

Hardware Wizard

The Hardware wizard helps you install, uninstall, repair, unplug, eject, and configure your hardware.

Device Manager

The Device Manager lists all the hardware devices installed on your computer. Use the Device Manager to change the properties of any device.

Hardware Profiles

Hardware profiles provide a way for you to set up and store different hardware configurations.

Figure 3-22 System Properties

3-15-2Optional Check Devices (cont'd)

3.) Verify that the Device Manager appears as shown in Figure 3-23. Your display may vary.

4.) You should see no devices with question marks or other icons, **except the VIA PCI Audio Controller (WDM)**. This one device will be shown as below with a red **X** through it.

5.) There are two audio controllers. The VIA PCI Audio Controller (WDM) is disabled so that the Doppler audio works correctly through the Creative Labs SB Live series sound card.

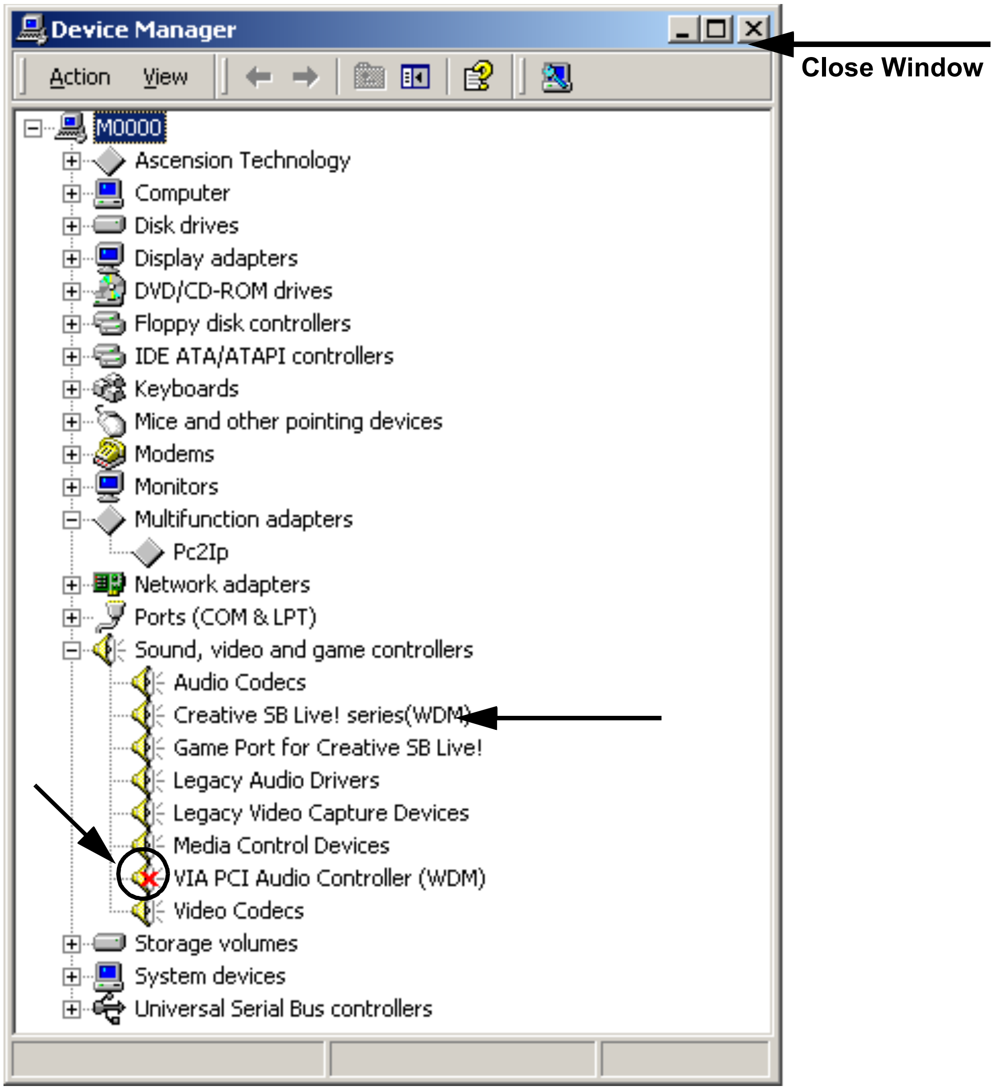


Figure 3-23 Device Manager

6.) Close the **Device Manager** window by selecting the close window X in the corner.

7.) Close the **System Properties** window by selecting the close window X in the corner.

3-15-3 Optional Procedure for Changing (Re-mapping) Drive Letters

An automated process was developed for this. It was implemented in Base Image Load -9 or later.

NOTE: If you are using a Base Image Load of -8 or earlier, or the -9 and later Base Image Load fails to properly map the drives, prodeed with manually assigning the proper drive letters.

1.) First check to see if you need to change the drive letters on the CDROM drive and the Magneto Optical drives – they **SHOULD** be G: and H: respectively.

2.) Right-click on the “My Computer” icon on the Windows desktop.

3.) Select “Manage” you should see a screen like Figure 3-24.

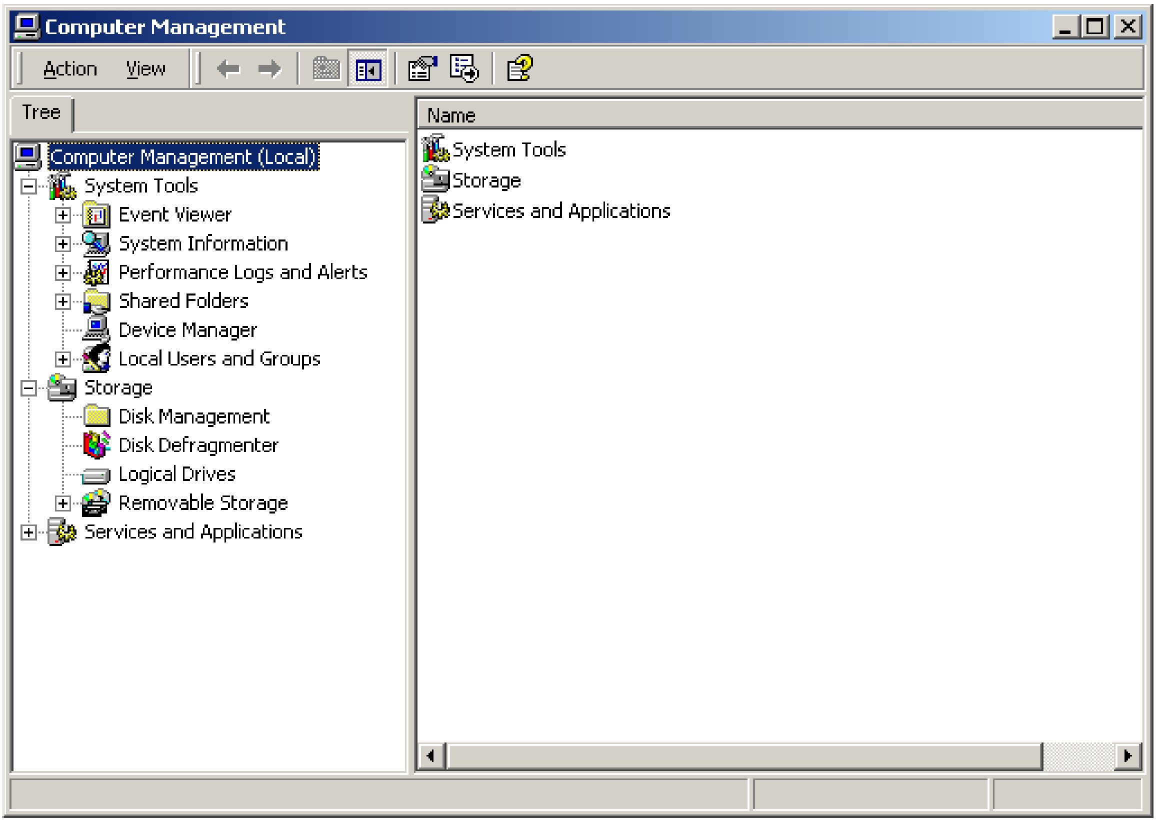
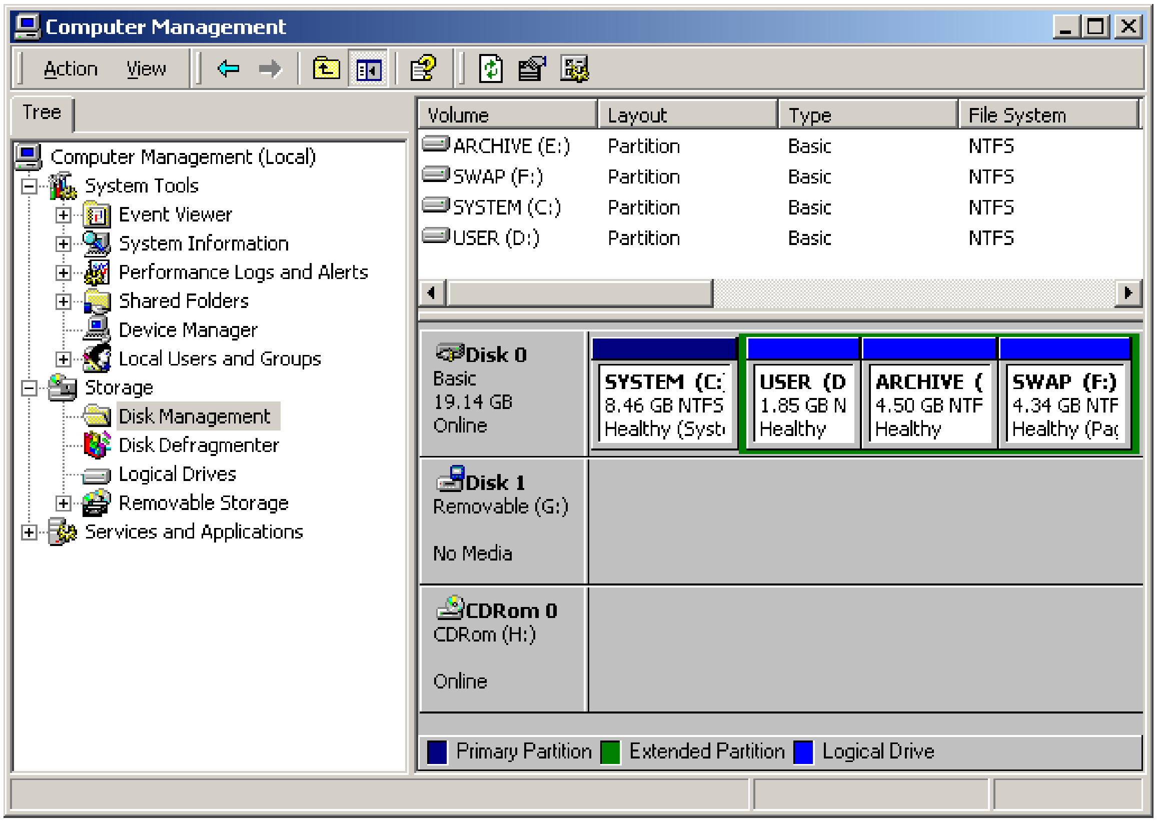


Figure 3-24 Computer Management

4.) Click on the “Disk Management” icon on the left side of the screen under “Storage”. You'll see this screen like Figure 3-25.

3-15-3Optional Procedure for Changing (Re-mapping) Drive Letters (cont'd)



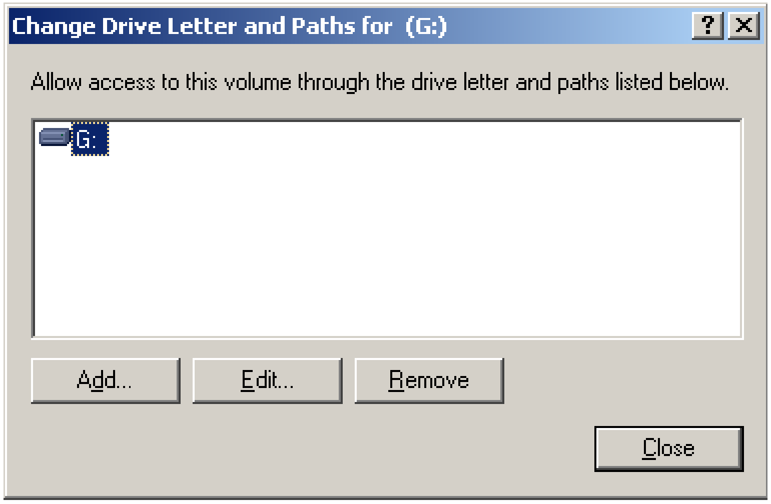
Volume	Layout	Type	File System
ARCHIVE (E:)	Partition	Basic	NTFS
SWAP (F:)	Partition	Basic	NTFS
SYSTEM (C:)	Partition	Basic	NTFS
USER (D:)	Partition	Basic	NTFS

Figure 3-25 Disk Management

5.) Notice that "**Disk 1 Removable**" is shown as drive letter "G:" and "**CD-ROM 0**" is shown as drive letter "H:" - **These are incorrect drive letters.** This procedure will show you how to change them to the proper designations which is the reverse of how they are now.

6.) Left-click on the "**Disk 1 Removable**" and select "Change Drive Letter and Path…". You'll see a screen as shown in Figure 3-26.

3-15-3Optional Procedure for Changing (Re-mapping) Drive Letters (cont'd)

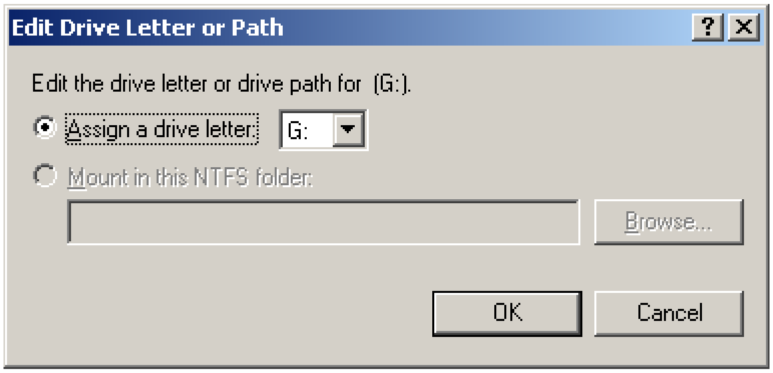

Change Drive Letter and Paths for (G:)

Allow access to this volume through the drive letter and paths listed below.

G:

Figure 3-26 Change Drive Letter and Path

7.) Right-click on "Edit…" and you'll see a screen as shown in Figure 3-27.


Edit Drive Letter or Path

Edit the drive letter or drive path for (G:).

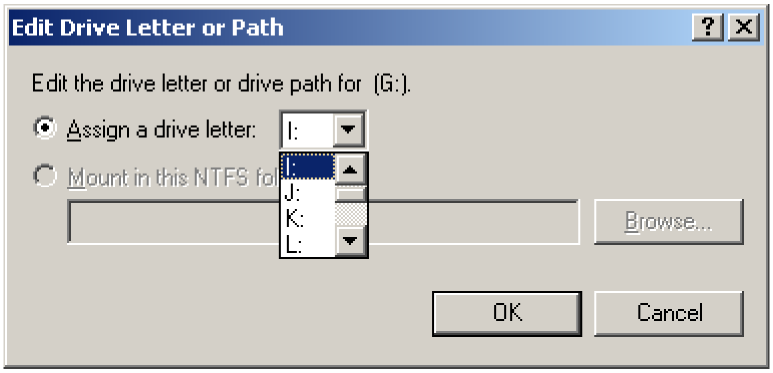
● Assign a drive letter: G:

○ Mount in this NTFS folder:

Figure 3-27 Select Drive to Assign

8.) Now Right-click on the little down arrow and you'll see the list box open with a list of available drive letters. Select the letter "I:"

3-15-3 Optional Procedure for Changing (Re-mapping) Drive Letters (cont'd)

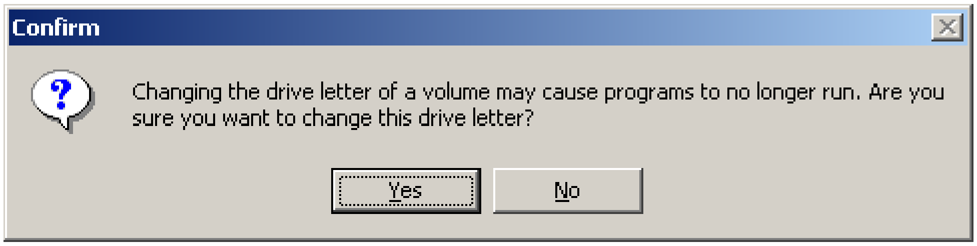


Edit the drive letter or drive path for (G:).

● Assign a drive letter: I:

Figure 3-28 Select Drive Letter I

9.) Now Right-click "OK". You'll see the following message as shown in Figure 3-29.



Changing the drive letter of a volume may cause programs to no longer run. Are you sure you want to change this drive letter?

Figure 3-29 Confirm Drive Letter Change

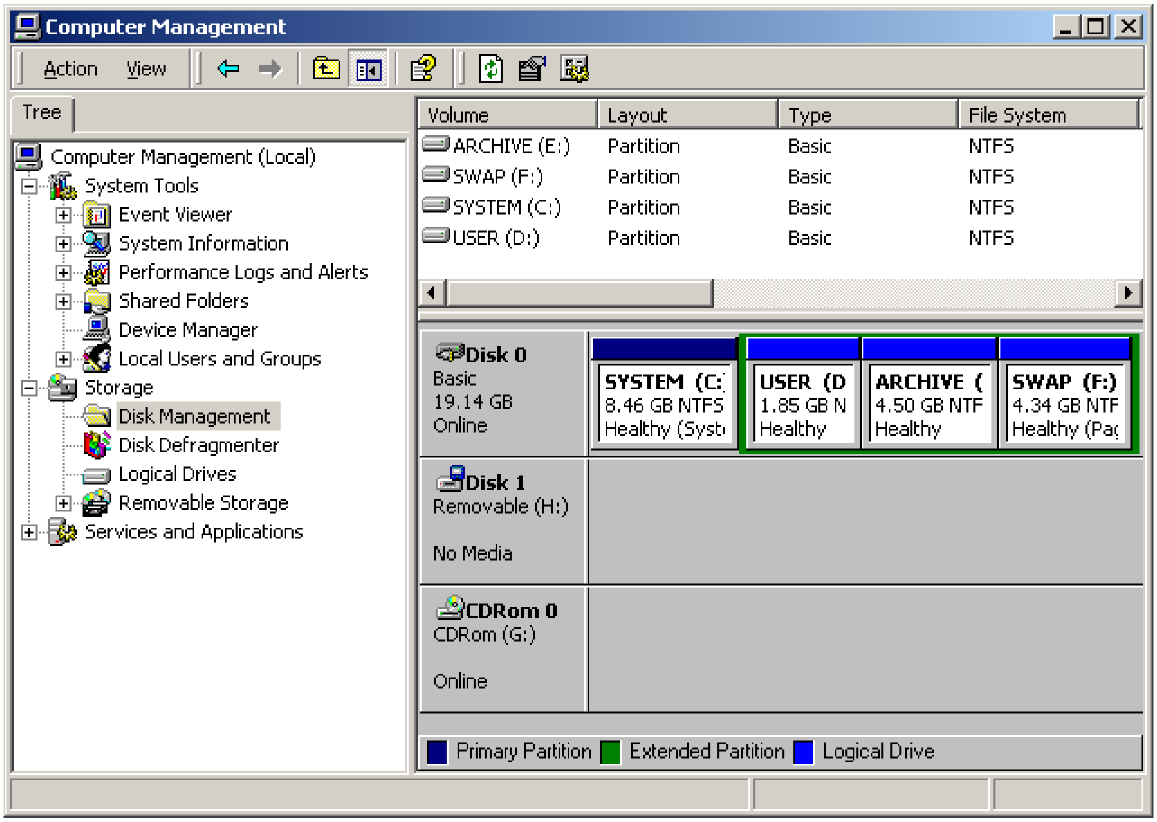
10.) Right-click "OK" to acknowledge the message.

11.) Now follow the previous steps again and change the "**CD-ROM 0**" to "**G:**".

12.) Follow the previous steps one more time to change the "**Disk 1 Removable**" to "**H:**".

13.) When you're all done the settings should look like those shown in Figure 3-30.

3-15-3Optional Procedure for Changing (Re-mapping) Drive Letters (cont'd)



Volume	Layout	Type	File System
ARCHIVE (E:)	Partition	Basic	NTFS
SWAP (F:)	Partition	Basic	NTFS
SYSTEM (C:)	Partition	Basic	NTFS
USER (D:)	Partition	Basic	NTFS

Figure 3-30 Confirm Drive Letter Assignment

Congratulations! You've just successfully re-mapped the drive letters of the CDROM drive and Magneto Optical drive to their proper configuration.

Exit the Computer Management screen.

3-15-4 Possible Behavior of the First Power Up After Application Load

After installing the new Application Software, if a new Front Panel code is needed:

The first time the Ultrasound application (echoloader) is run after the software upgrade, the application will detect that the Front Panel code is out of date. Because the Front Panel has to have power removed and re-applied before the Front Panel code update process can continue, the application boot up will automatically shut down the LOGIQ™ 9 just before the application boot up is complete.

In some cases, the system may not shutdown automatically. If the dialog box appears, "Ending Process, Please wait...", please wait 2 minutes. If the system does not turn off, force the shut down by holding down the on/off key until the monitor turns off then let it complete the power down process.

Simply ensure the system has powered down, and the power button is amber, then restart the system to load the Ultrasound application. The auto-power down will only occur on the first power up after the application upgrade.

3-15-5 GE USB Control Panel Driver Loss

NOTE: While the loss of drivers should not happen with the current application software loading process, this section remains as a reference.

Sometimes, after loading new software (or the first time load of software), the GE Front Panel may not function after Applications (echoloader) has brought the system up in scan mode. The alpha-numeric keyboard, trackball and two set keys will function but the touch panel and all other GE controls on the operator interface will NOT function.

Watch the system closely as the system boots up. Early in the process, during the BIOS load, the front panel lights will flash yellow then green and go out. This basically means the front panel is "healthy" or functional.

During the Applications loading process of boot up, when the blue bar on the image monitor is about 2/3rds of the way complete, the front panel lights will flash again. This basically confirms USB communication with the front panel.

During the software load process, the USB driver for the GE Control Panel may get corrupted. A simple Windows Driver Upgrade (update) will cure the problem.

3-15-5GE USB Control Panel Driver Loss (cont'd)

1.) Properly Power down the system.

2.) Ensure that your Service Dongle is installed on the USB port in the back of the system.

3.) Power up the system.

4.) Select MAINTENACE... to enter the maintenance mode.

5.) Leave the User name blank, enter the current service Password and select EXIT TO WINDOWS.

6.) Trackball to MY COMPUTER and left click.

7.) Right click on PROPERTIES

8.) Right click on the HARDWARE Tab

9.) Right Click on DEVICE MANAGER in the middle-right of the Hardware tab window.

Look through the Device Manager menu items and hardware selections for big yellow question marks or exclamation marks in a yellow oval. You should find an unknown device or a USB hardware selection that is not functioning.

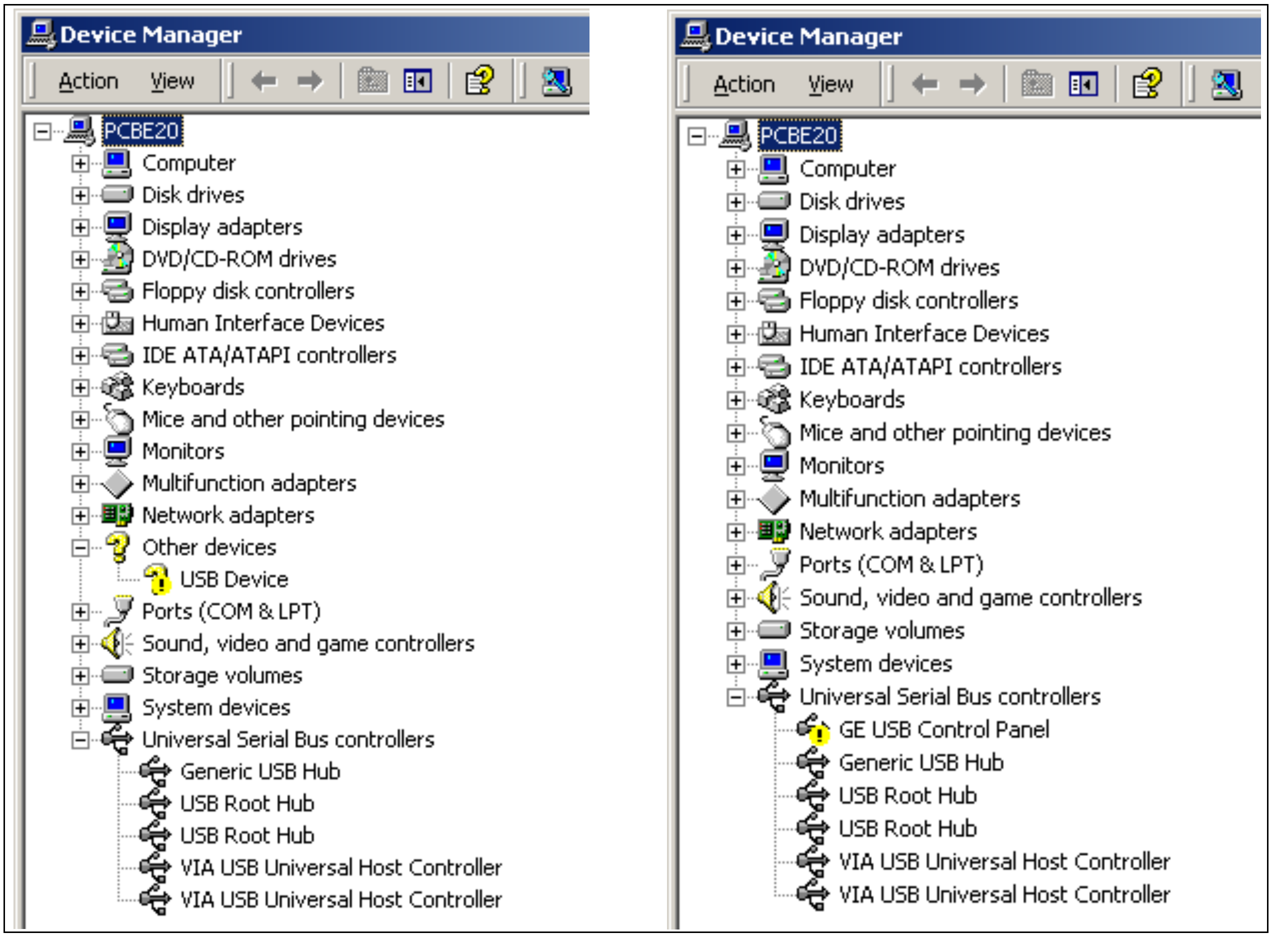


Figure 3-31 Bad USB Driver

10.) Double right click on the yellow question mark or exclamation mark.

3-15-5GE USB Control Panel Driver Loss (cont'd)

11.) In the GENERAL Tab for the hardware device select REINSTALL DRIVER.

12.) Select NEXT in the Driver Upgrade Wizard.

13.) Ensure that the *Search for a suitable driver for my device (recommended)* button is highlighted and then click on NEXT.

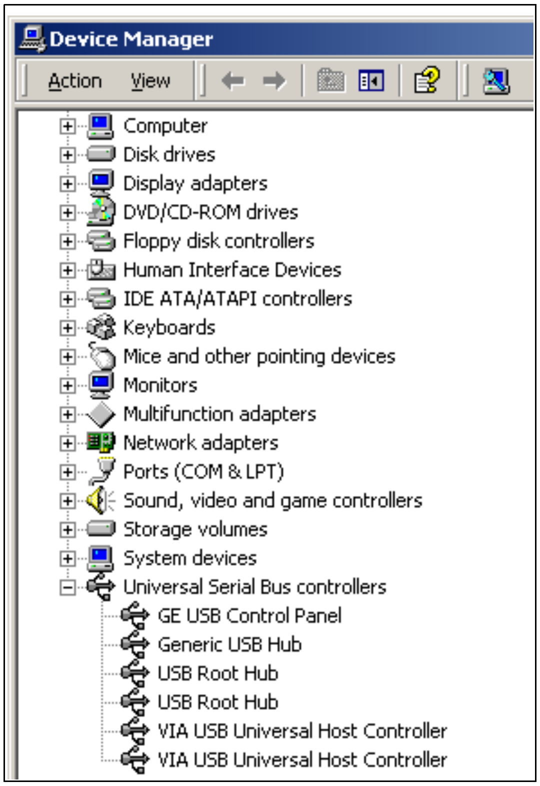
14.) From the Locate Driver Files window select *Specify a location*. Then click on NEXT.

15.) In the *Copy manufacturer's files from:* drop down box select ***C:\WINNT\System32\Drivers*** and select OK

16.) The Found Driver window will appear with the selected driver for the hardware device. Select NEXT to install the driver.

17.) Select FINISH from the last Driver Upgrade Wizard screen.

There should not be other problems but, if there are other hardware devices that need correcting, repeat step number 10 through 17.



- Computer
- Disk drives
- Display adapters
- DVD/CD-ROM drives
- Floppy disk controllers
- Human Interface Devices
- IDE ATA/ATAPI controllers
- Keyboards
- Mice and other pointing devices
- Monitors
- Multifunction adapters
- Network adapters
- Ports (COM & LPT)
- Sound, video and game controllers
- Storage volumes
- System devices
- Universal Serial Bus controllers
  - GE USB Control Panel
  - Generic USB Hub
  - USB Root Hub
  - USB Root Hub
  - VIA USB Universal Host Controller
  - VIA USB Universal Host Controller

Figure 3-32 Good USB Drivers

NOTE: *Double check in the Device Manager the under USB Controllers to ensure that the GE USB Control Panel has no yellow question marks or exclamation marks in a yellow oval.*

18.) Close all windows and select the GO MUSASHI shortcut to start the echoloader application. The touch panel and GE control panel knobs, buttons and switches should now be fully functional.

3-15-6 If the System is NOT on a Network

If the system is connected to a network, skip this section.

If the system is **NOT** on a network, a static "dummy" IP-Address must be install in Windows for DICOM and Daignostics to function.

To install a Static IP-Address in windows:

1.) Boot up the system with the service dongle attached to the USB port.
2.) From the Start Applications dialog box, like the one shown in Figure 3-33, select MAINTENANCE Mode to enter the Windows desktop.
3.) The Maintenance Password screen will appear. Enter the current Service Password.
4.) Select Exit to Windows.

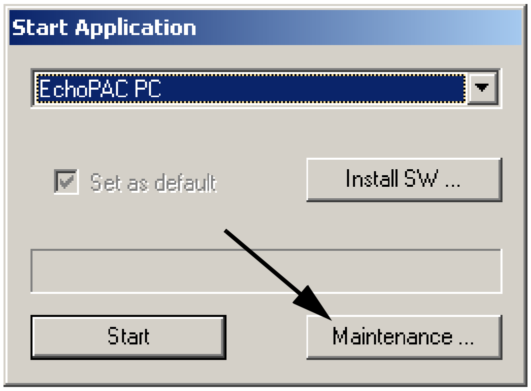
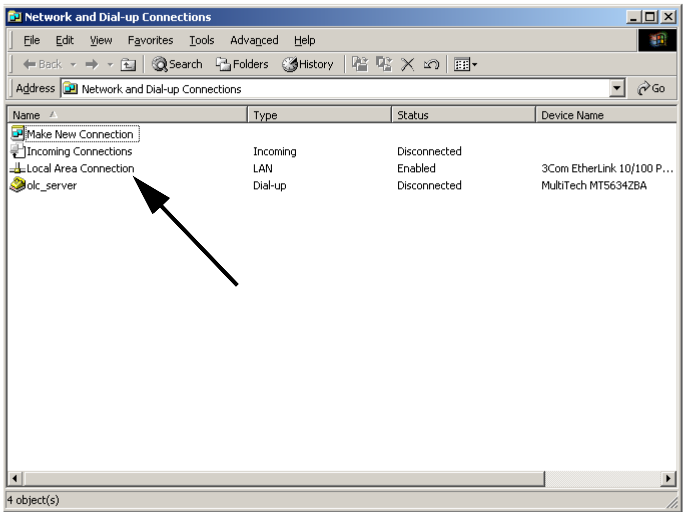


Figure 3-33 Select Maintenace Mode

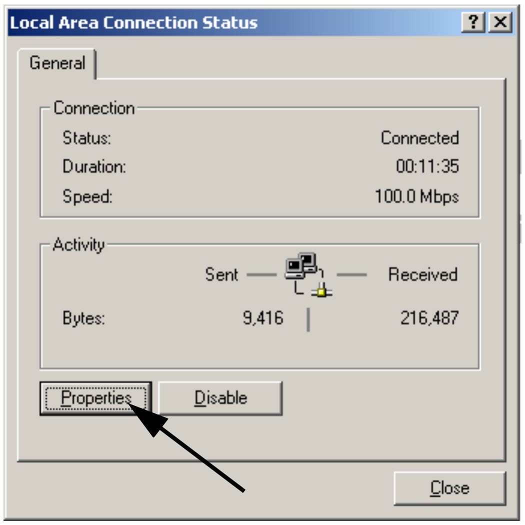
5.) From the task bar at the bottom of the Touch Panel select START>SETTINGS>NETWORK DIALUP CONNECTIONS.
6.) From the window shown in Figure 3-34, double click on LOCAL AREA CONNECTIONS.


Network and Dial-up Connections
File Edit View Favorites Tools Advanced Help
Back Search Folders History
Address Network and Dial-up Connections
Go
4 object(s)

Name	Type	Status	Device Name
Make New Connection			
Incoming Connections	Incoming	Disconnected	
Local Area Connection	LAN	Enabled	3Com EtherLink 10/100 P…
olc_server	Dial-up	Disconnected	MultiTech MT5634ZBA

Figure 3-34 Network and Dialup Connections Window

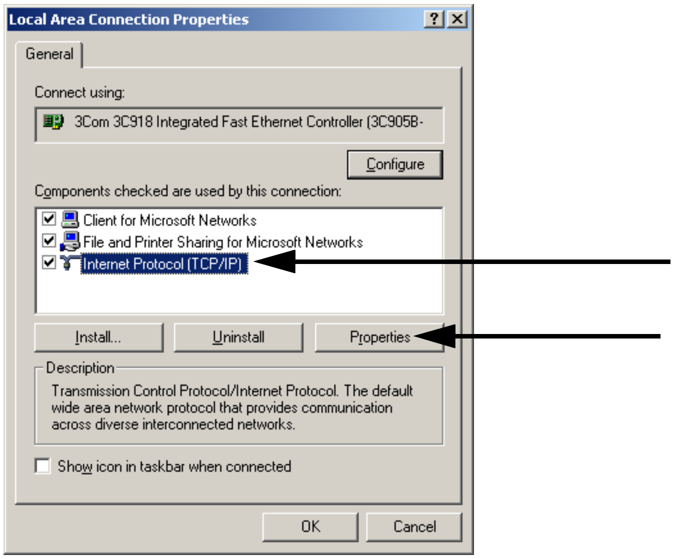
7.) IF the local Area Connections Status Window is displayed, as shown in Figure 3-35, click on PROPERTIES.



Status: Connected
Duration: 00:11:35
Speed: 100.0 Mbps
Bytes: 9,416 | 216,487

Figure 3-35 Connection Status Window

8.) Hightlight INTERNET PROTOCOL (TCPIP) and select PROPERTIES as shown in Figure 3-36.



Connect using:
3Com 3C918 Integrated Fast Ethernet Controller (3C905B-

Components checked are used by this connection:
☑ Client for Microsoft Networks
☑ File and Printer Sharing for Microsoft Networks
☑ Internet Protocol (TCP/IP)

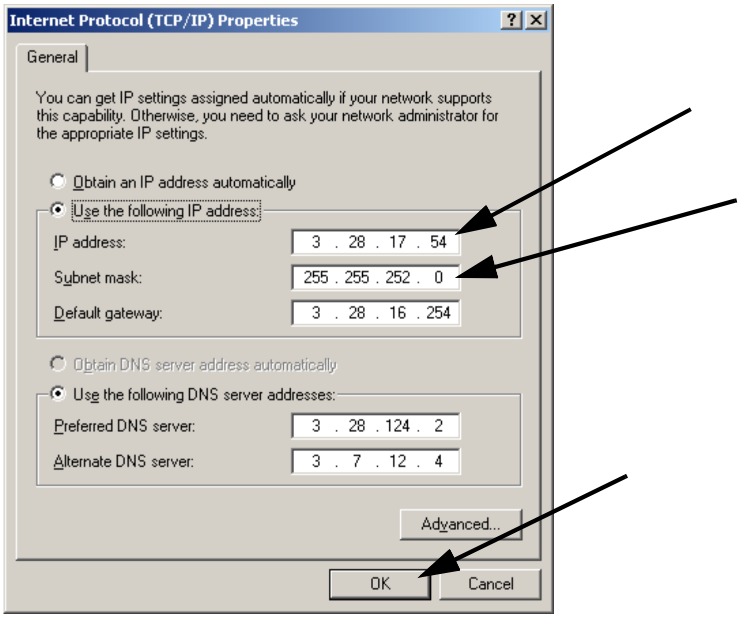
Description
Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

☐ Show icon in taskbar when connected

Figure 3-36 TCPIP Properties Selection

9.) Select *Use this following IP address*. Fill in:

- IP-Address: 3.28.28.28
- Subnet Mask : 255.255.252.0



You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

○ Obtain an IP address automatically
● Use the following IP address:
IP address: 3 . 28 . 17 . 54
Subnet mask: 255 . 255 . 252 . 0
Default gateway: 3 . 28 . 16 . 254

○ Obtain DNS server address automatically
● Use the following DNS server addresses:
Preferred DNS server: 3 . 28 . 124 . 2
Alternate DNS server: 3 . 7 . 12 . 4

Figure 3-37 Static Network Settings in Windows

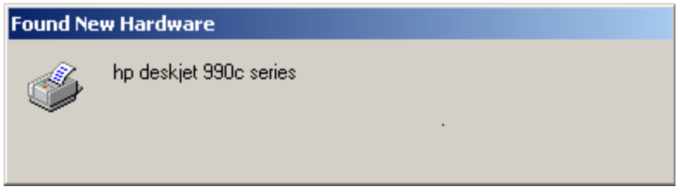
Section 3-16
Installing USB Line Printer - HP970/990

1.) Install the printer after the system has been ghosted, but before application software has been installed. Just plugging in the USB cable is enough to install the printer.
2.) If a service key is available, enter maintenance mode and exit to the desktop. Plug in the USB cable and the printer will install correctly.
3.) If the printer is installed while in application mode, excessive CPU time will be consumed and the system will become very slow to unusable. Shutting down and rebooting will clear the condition. The printer will function correctly, after this.

3-16-1 Optional USB Line Printer - HP970/990

This procedure assumes that the LOGIQ™ 9 base system software load image is installed and application software has been installed and is functioning properly. It also assumes that the printer was not installed directly after the Base Image Load. Disconnect any external printers connected to the service key port (USB port) on the rear of the LOGIQ™ 9 system.

1.) Power off the LOGIQ™ 9 ultrasound system.
2.) Insert a valid service key (dongle) into the service key port (USB port) on the rear of the scanner.
3.) Power up the scanner.
4.) When the “Start Application” dialog box appears, click “Maintenance” and type the current password and press enter.
5.) When the “Maintenance” screen appears, click “Exit to Windows”.
6.) Press CTRL-ALT-DEL to bring up the Task Manager and ensure that the “Applications” tab is the highlighted tab.
7.) Click on the “New Task...” button in the lower right hand corner of this window.
8.) In the “Create New Task” dialog box, type: “USERINIT” and press enter.
9.) Minimize the Task Manager.
10.) Click “Start” > “Settings” > “Printers”.
11.) Remove the service key (dongle) now that you’ve gotten to the desktop.
12.) Attach the USB cable from the printer to the USB port on the back of the ultrasound system.
13.) If you’re attaching a HP Diskette 990Cxi or 970Cxi printer, the system should immediately recognize the newly attached printer and automatically install and configure the printer for you without any additional user intervention.


Found New Hardware

hp deskjet 990c series

Figure 3-38 Found 990Cxi Printer

Print Key Assignment and Checkout

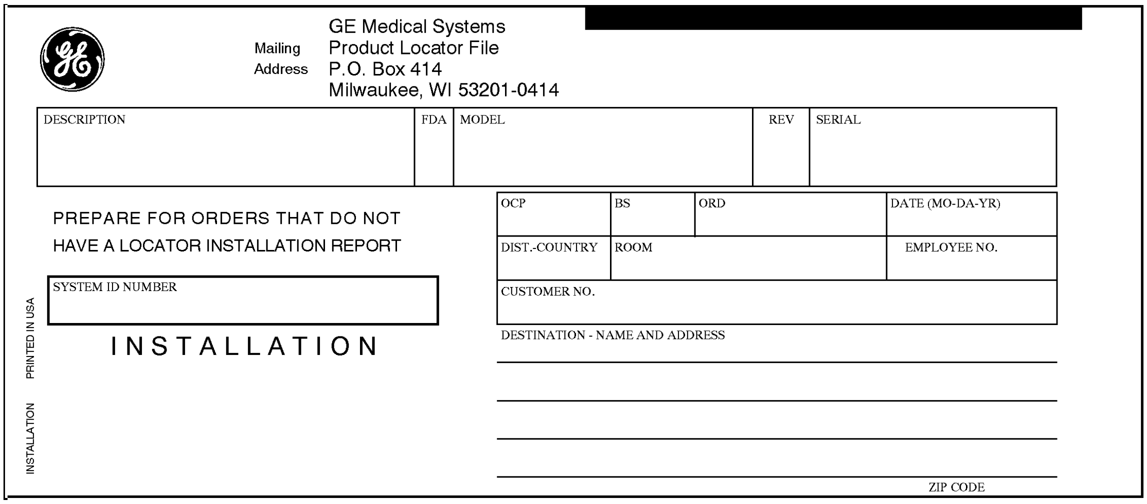
1.) Ensure that you have one of the front panel “Print” keys (P1-4) assigned to print on this new printer. Select Utility > Adman > Connectivity > Buttons >. Choose one of the print buttons and under “Destinations”, select “Standard Printer@MyComputer” from the drop-down list box.
2.) Press the key you just configured and you should get a printout of the screen you printed from.

Section 3-17
Paperwork

NOTE: *During and after installation, the documentation (i.e. User Manuals, Installation Manuals...) for the peripheral units must be kept as part of the original system documentation. This will ensure that all relevant safety and user information is available during the operation and service of the complete system.*

3-17-1 Product Locator Installation

NOTE: *The Product Locator Installation Card shown may not be same as the provided Product Locator card.*



Mailing Address
GE Medical Systems
Product Locator File
P.O. Box 414
Milwaukee, WI 53201-0414

[redacted]

DESCRIPTION	FDA	MODEL	REV	SERIAL

PREPARE FOR ORDERS THAT DO NOT
HAVE A LOCATOR INSTALLATION REPORT

SYSTEM ID NUMBER

INSTALLATION

OCP	BS	ORD	DATE (MO-DA-YR)
DIST.-COUNTRY	ROOM		EMPLOYEE NO.
CUSTOMER NO.			

DESTINATION - NAME AND ADDRESS

ZIP CODE

INSTALLATION PRINTED IN USA

Figure 3-39 Product Locator Installation Card

3-17-2 User Manual(s)

Check that the correct User Manual(s) for the system and software revision, is included with the installation. Specific language versions of the User Manual may also be available. Check with your GE Sales Representative for availability.

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Chapter 4
Functional Checks

Section 4-1
Overview

4-1-1 Purpose of Chapter 4

This chapter provides procedures for quickly checking major functions of the LOGIQ™ 9 scanner diagnostics by using the built-in service software, and power supply adjustments.

Table 4-1 Chapter 4 Contents

Section	Description	Page Number
4-1	Overview	4-1
4-2	Required Equipment	4-1
4-3	General Procedure	4-2
4-4	Software Configuration Checks	4-20
4-5	Peripheral Checks	4-21
4-6	Mechanical Function Checks	4-22
4-7	Site Log	4-24

⚠ **NOTICE** **Most of the information pertaining to this *Functional Checks* chapter is found in the *LOGIQ™ 9 Quick Guide* (Direction number 2309820-100).**

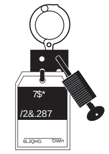
Section 4-2
Required Equipment

- An empty (blank) MO Disk.
- At least one transducer. See “Probes” on page 1-41. for an overview.
  (normally you should check all the transducers used on the system)

Section 4-3
General Procedure

CAUTION **SYSTEM REQUIRES ALL COVERS**
Operate this unit only when all board covers and frame panels are securely in place. The covers are required for safe operation, good system performance and cooling purposes.

NOTICE Energy Control and Power Lockout



When servicing parts of the system where there is exposure to voltage greater than 30 Volts:
Unplug the system
Maintain control of the system power plug
Wait for at least 20 seconds for capacitors to discharge

Beware that some parts of the system may be energized even if the power is turned off but the cord is still plugged into the AC Outlet.

4-3-1 Power On / Boot Up

NOTE: *After turning off a system, wait at least ten seconds before turning it on again. The system may not be able to boot if power is recycled too quickly.*

4-3-1-1 Scanner Power On

1.) Connect the Power Cable to the back of the system.
2.) Ensure the Cable Clip slips securely over the shoulders on the molded plug.
3.) Connect the Power Cable to an appropriate mains power outlet.
4.) Switch ON the Circuit Breaker at the rear of the system.

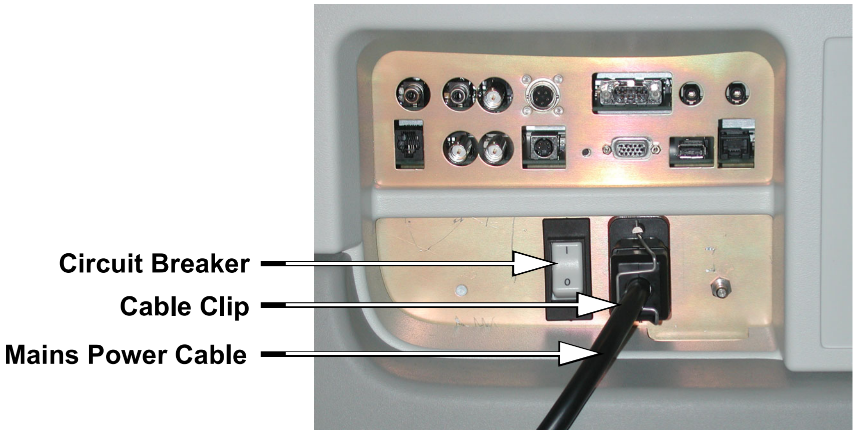


Figure 4-1 Circuit Breaker and Power Cable on Back of Scanner

When power is applied to the scanner and the rear Circuit Breaker is turned ON, power is distributed to the Cooling Unit, Control Panel, Monitor, Internal and External I/O Boards, Peripherals and the Back-end Processor.

NOTICE When AC power is applied to the scanner, the **Standby** switch on the Control panel illuminates amber, indicating the Backend Processor is in standby mode.

4-3-1-2 Back-end Processor Boot Up

Press the **Standby** switch on the Control Panel once.

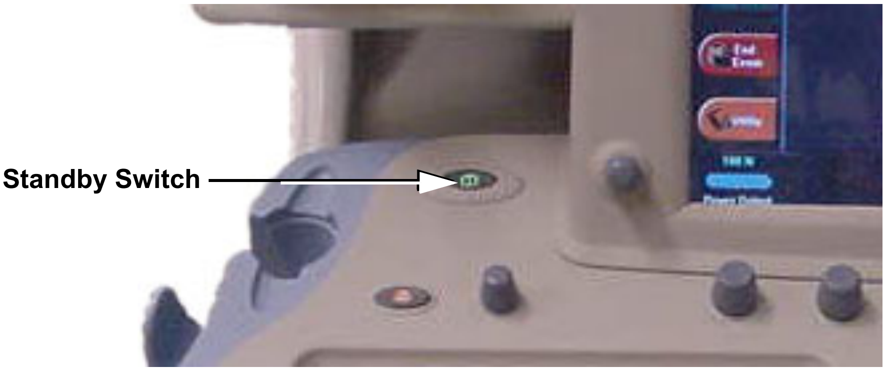


Figure 4-2 Standby Switch for Back-end Processor Boot Up

When the **Standby** switch on the Control Panel is pressed once, the Back-end Processor starts and the software code is distributed to initiate the scanner.

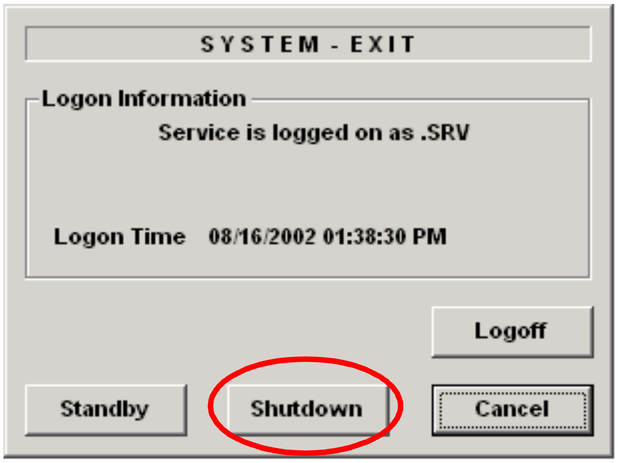
No status messages are displayed during this process.

4-3-2 Power Off / Shutdown

NOTE: *After turning off a system, wait at least ten seconds before turning it on again. The system may not be able to boot if power is recycled too quickly.*

4-3-2-1 Back End Processor Power Off

1.) Press the **Standby** switch on the Control Panel once to display the SYSTEM - EXIT menu.
2.) Select Shutdown from the SYSTEM - EXIT menu.
3.) Wait for the system to properly close all files and shutdown.



Service is logged on as .SRV

Logon Time 08/16/2002 01:38:30 PM

Figure 4-3 System Exit Menu for Back-end Processor Power Down

4-3-2-2 Scanner Shutdown

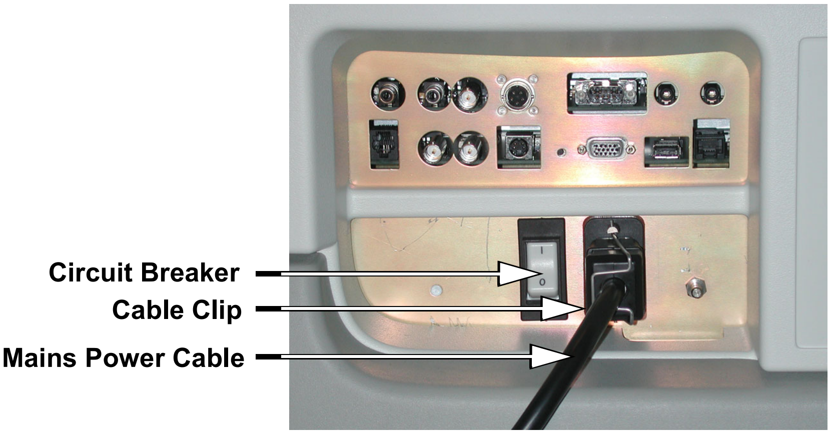


Figure 4-4 Circuit Breaker and Power Cable on Back of Scanner

1.) From the rear of the system. switch OFF the Circuit Breaker.

2.) Disconnect the Mains Power Cable by unfastening the metal wire fastener.

NOTICE Disconnecting the Mains Power Cable *before* switching OFF the Circuit Breaker will activate the uninterruptible power system (UPS) in the Back End Processor, forcing an ordered shutdown of the system.

4-3-3 System Features

4-3-3-1 Control Panel

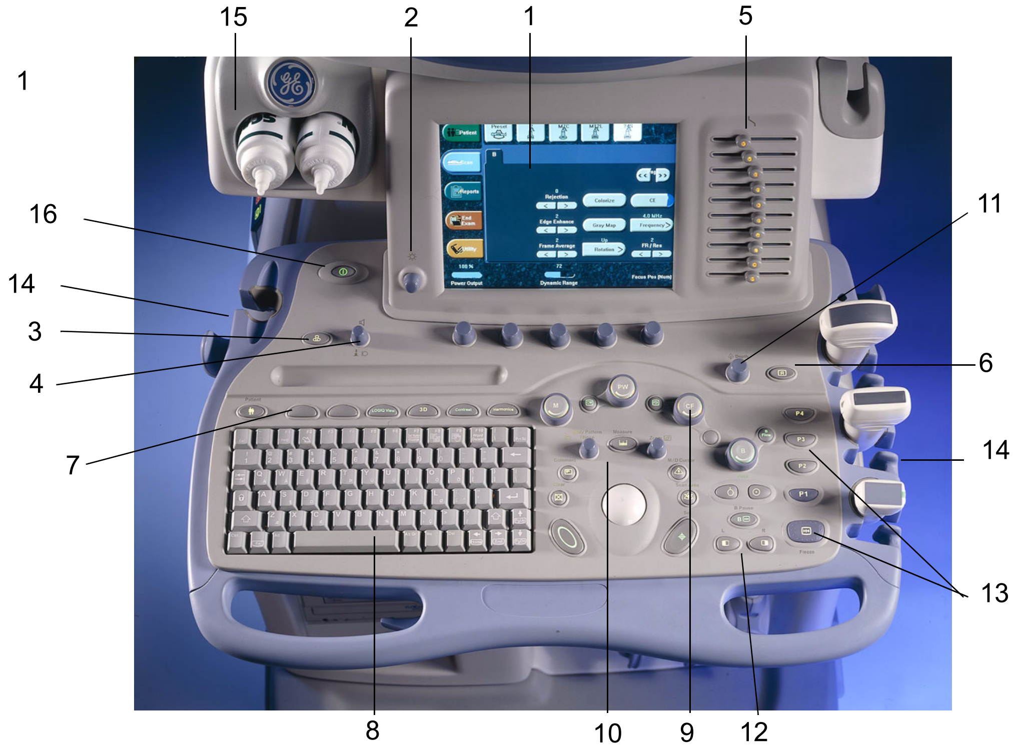


Figure 4-5 Control Panel Tour

1.) Touch Panel and Controls
2.) Touch Panel Brightness Control
3.) Video
4.) Audio On/Off and Volume
5.) TGC
6.) Reverse
7.) Additional Feature Keys
8.) Keyboard
9.) Mode/Gain Keys
10.) Imaging/Measurement Keys
11.) Depth
12.) Imaging Feature Keys
13.) Freeze and Print Keys
14.) Probe Holder
15.) Gel Holder
16.) Standby Switch

4-3-3-2 Touch Panel

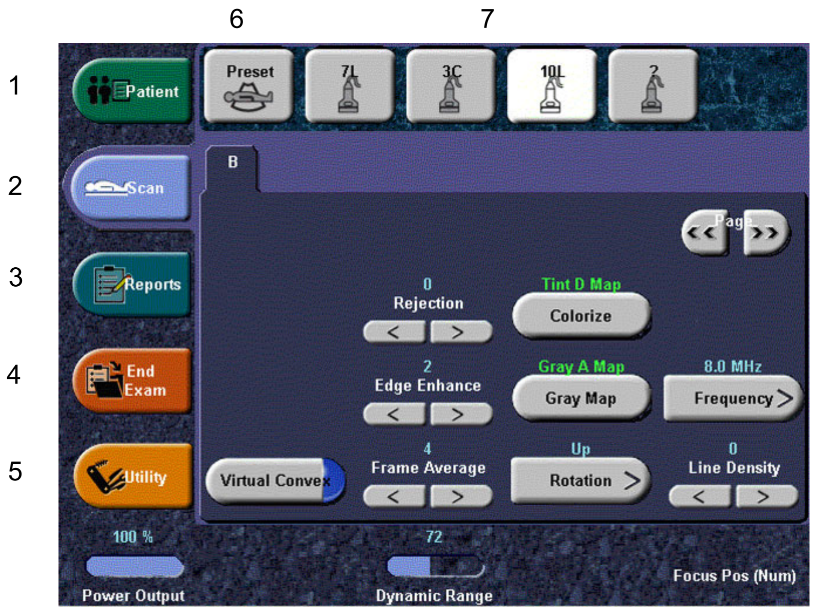


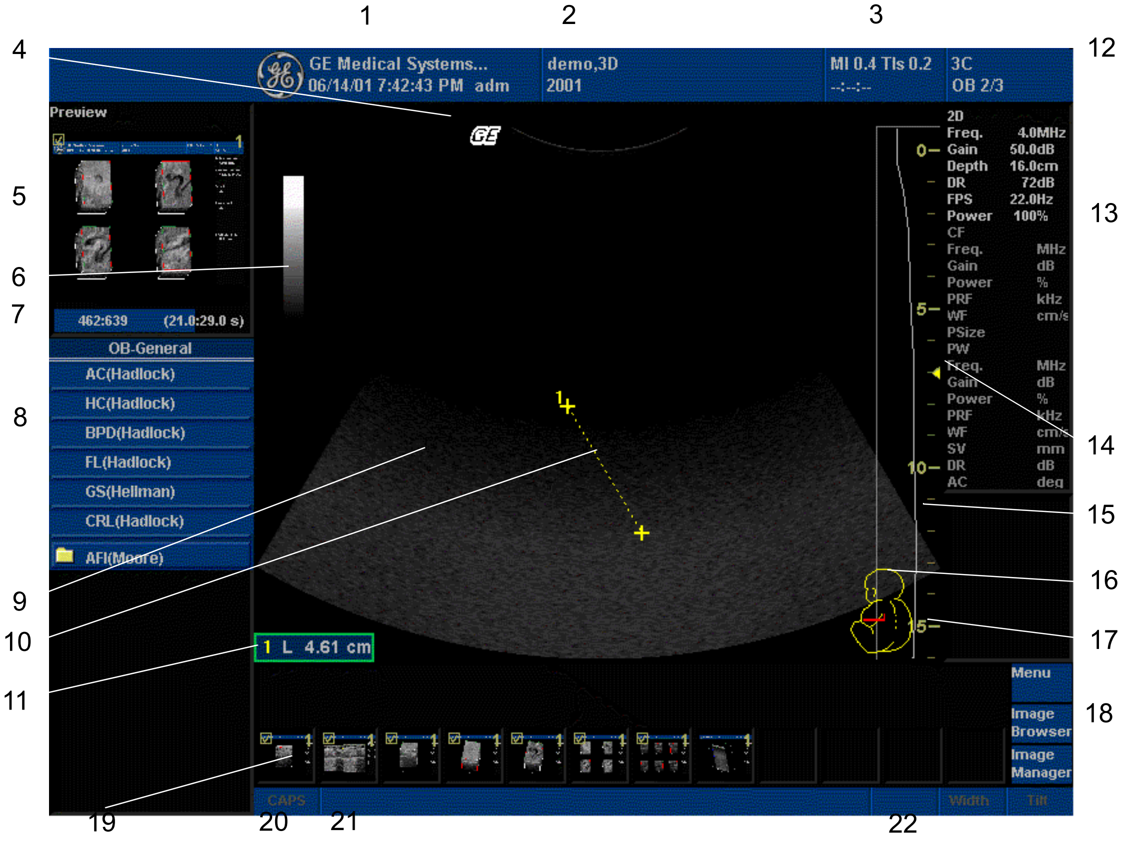
Figure 4-6 Touch Panel Display Tour

1.) Patient: Enter Patient screen
2.) Scan: Enter scanning mode screen
3.) Reports: Activates default report and Touch Panel of report choices.
4.) End Exam: Activates Image Management and Touch Panel with end of exam options.
5.) Utility: Activates the configuration system.
6.) Preset: Select the application to use.
7.) Probe Indicator: Indicates and selects the probes.

NOTE: Different menus are displayed depending on which Touch Panel Menu is selected.

At the bottom of the Touch Panel, there are five combination rotary dials/push buttons. The functionality of these rotaries changes, depending upon the currently displayed menu. Press the button to switch between controls (as with Focus Position/Number), or rotate the dial to adjust the value.

4-3-3-3 Monitor Display



GE Medical Systems...
06/14/01 7:42:43 PM adm

demo,3D
2001

MI 0.4 TIs 0.2
--:--:--

3C
OB 2/3

2D
Freq. 4.0MHz
Gain 50.0dB
Depth 16.0cm
DR 72dB
FPS 22.0Hz
Power 100%
CF
Freq. MHz
Gain dB
Power %
PRF kHz
WF cm/s
PSize
PW
Freq. MHz
Gain dB
Power %
PRF kHz
WF cm/s
SV mm
DR dB
AC deg

462:639 (21.0:29.0 s)

1 L 4.61 cm

Figure 4-7 Monitor Display Tour

Table 4-2 Monitor Display Features

1. Institution/Hospital Name, Date, Time, Operator Identification.	12. Probe Identifier. Exam Study.
2. Patient Name, Patient Identification.	13. Imaging Parameters by Mode (current mode highlighted).
3. Power Output Readout, System Status (real-time or frozen)	14. Focal Zone.
4. GE Symbol: Probe Orientation Marker. Coincides with a probe orientation marking on the probe.	15. TGC.
5. Image Preview.	16. Body Pattern.
6. Gray/Color Bar.	17. Depth Scale.
7. Cine Gauge.	18. Image Management Menu: Menu, Delete, and Image Manager.
8. Measurement Summary Window.	19. Image Palette.
9. Image.	20. Caps Lock: On/Off.
10. Measurement.	21. System Messages Display.
11. Results Window.	22. Trackball Functionality Status: Scroll, M&A (Measurement and Analysis), Position, Size, Scan Area Width and Tilt.

4-3-4 System B/M-Mode Checks

For a basic functional check of the system's different modes, the Quick Guide will familiarize you with image optimization for **B-Mode**, **M-Mode**, **Color Flow**, and **Doppler**.

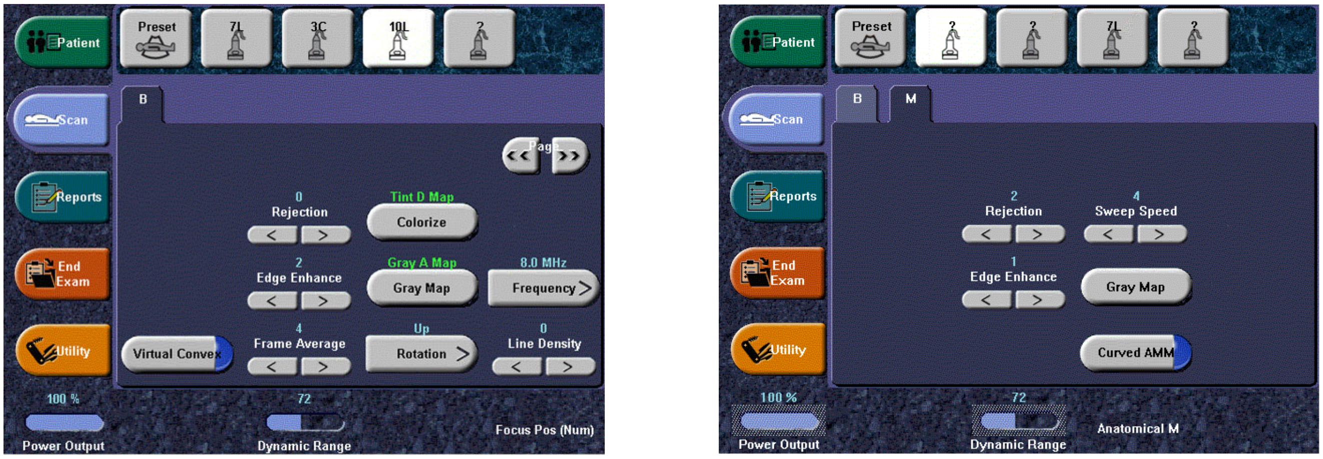


Figure 4-8

Table 4-3 **B/M-Mode Functions**

Power Output (Acoustic Power)	Optimizes image quality and allows user to reduce beam intensity. 10% increments between 0-100%. Values greater than 0.1 are displayed
Dynamic Range	Dynamic Range controls how echo intensities are converted to shades of gray, thereby increasing the adjustable range of contrast.
Focus Number and Position	Increases the number of transmit focal zones or moves the focal zone(s) so that you can tighten up the beam for a specific area. A graphic caret corresponding to the focal zone position(s) appears on the right edge of the image.
Rejection	Selects a level below which echoes will not be amplified (an echo must have a certain minimum amplitude before it will be processed).
Edge Enhance	Edge Enhance brings out subtle tissue differences and boundaries by enhancing the gray scale differences corresponding to the edges of structures. Adjustments to M Mode's edge enhancement affects the M Mode only.
Frame Average	Temporal filter that averages frames together. This has the effect of presenting a smoother, softer image.
Colorize	Enables gray scale image colorization. To deactivate, reselect a Gray Map.
Gray Map	Determines how the echo intensity levels received are presented as shades of gray.
Rotation (Up/Down)	Rotates the image by selecting the value from the pop up menu.
Frequency	Multi Frequency mode lets you downshift to the probe's next lower frequency or shift up to a higher frequency.

Table 4-3 B/M-Mode Functions

Frame Rate/Resolution	Optimizes B Mode frame rate or spatial resolution for the best possible image.
B Flow	Provides intuitive representation of non-quantitative hemodynamics in vascular structures.
Sensitivity/PRI	Adjusts the sample rate for the flow signal.
Background On/Off	Background On lets you view the anatomy roadmap; Background Off lets you view just flow information.
Sweep Speed	Changes the speed at which the timeline is swept.

4-3-5 System CFM and PWD Checks

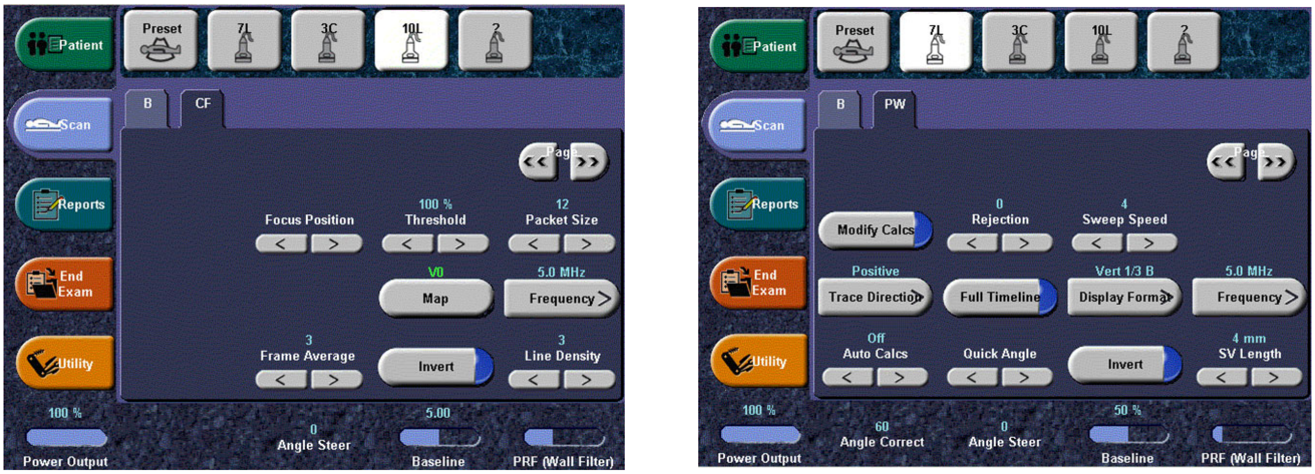


Figure 4-9 CFM and PWD Functions

Table 4-4 CFM and PWD Functions

Baseline	Adjusts the baseline to accommodate faster or slower blood flows to eliminate aliasing.
PRF/Wall Filter	Velocity scale determines pulse repetition frequency. If the sample volume gate range exceeds single gate PRF capability, the system automatically switches to high PRF mode. Multiple gates appear, and HPRF is indicated on the display.
Angle Correct	Estimates the flow velocity in a direction at an angle to the Doppler vector by computing the angle between the Doppler vector and the flow to be measured
Threshold	Threshold assigns the gray scale level at which color information stops.
Map	Allows a specific color map to be selected. After a selection has been made, the color bar displays the resultant map.
Invert	Allows blood flow to be viewed from a different perspective, i.e. red away (negative velocities) and blue toward (positive velocities). The real-time or frozen image can be inverted.

Table 4-4 CFM and PWD Functions

Packet Size	Controls the number of samples gathered for a single color flow vector.
Quick Angle Correct	Quickly adjusts the angle by 60 degrees
Doppler Display Formats	Display layout can be preset to have B-Mode and Time-motion side-by-side or over-under. In the side-by-side layout, there are three display alternatives defined: equal priority, time-motion priority or time-motion with B-Mode reference. In the over-under layout, there are three display alternatives defined: time-motion priority, B Mode priority or equal priority.
Sample Volume Gate Length	Sizes the sample volume gate
Scan Area	Slants the B-Mode or Color Flow linear image left or right to get more information without moving the probe

4-3-6 Basic Measurements

*NOTE: The following instructions assume that you first scan the patient and then press **Freeze**.*

4-3-6-1 Distance and Tissue Depth Measurements

1.) Press **MEASURE** once; an active caliper displays.
2.) To position the active caliper at the start point (distance) or the most anterior point (tissue depth), move the **TRACKBALL**.
3.) To fix the start point, press ***Set***. The system fixes the first caliper and displays a second active caliper.
4.) To position the second active caliper at the end point (distance) or the most posterior point (tissue depth), move the **TRACKBALL**.
5.) To complete the measurement, press **SET**. The system displays the distance or tissue depth value in the measurement results window.

Before you complete a measurement:

To toggle between active calipers, press **MEASURE**.

To erase the second caliper and the current data measured and start the measurement again, press **CLEAR** once.

*NOTE: To rotate through and activate previously fixed calipers, turn **CURSOR SELECT**.*

*NOTE: After you complete the measurement, to erase all data that has been measured to this point, but not data entered onto worksheets, press **CLEAR**.*

4-3-6-2 Circumference/Area (Ellipse) Measurement

1.) Press **MEASURE** once; an active caliper displays.
2.) To position the active caliper, move the **TRACKBALL**.
3.) To fix the start point, press **SET**. The system fixes the first caliper and displays a second active caliper.
4.) To position the second caliper, move the **TRACKBALL**.
5.) Turn the **ELLIPSE** control; an ellipse with an initial circle shape appears.

4-3-6-2 Circumference/Area (Ellipse) Measurement (cont'd)

NOTE: Be careful not to press the Ellipse control as this activates the Body Pattern.

6.) To position the ellipse and to size the measured axes (move the calipers), move the **TRACKBALL**.
7.) To increase the size, turn the **ELLIPSE** control in a clockwise direction. To decrease the size, turn the **ELLIPSE** control in a counterclockwise direction.
8.) To toggle between active calipers, press **MEASURE**.
9.) To complete the measurement, press **SET**. The system displays the circumference and area in the measurement results window.

Before you complete a measurement:

- To erase the ellipse and the current data measured, press **CLEAR** once. The original caliper is displayed to restart the measurement.
- To exit the measurement function without completing the measurement, press **CLEAR** a second time.

4-3-6-3 Worksheets

Measurement/Calculation worksheets are available to display and edit measurements and calculations. There are generic worksheets as well as Application specific worksheets. The worksheets are selected from the Measurement Touch Panel.

4-3-6-4 Report Pages

Measurements/Calculations that are included on the worksheet can also be displayed on Report Pages. Report Pages can be customized to meet the appropriate needs of the user.

4-3-7 Probe/Connectors Usage

4-3-7-1 Connecting a probe

1.) Place the probe's carrying case on a stable surface and open the case.
2.) Carefully remove the probe and unwrap the probe cable.
3.) DO NOT allow the probe head to hang free. Impact to the probe head could result in irreparable damage.
4.) Turn the connector locking handle counterclockwise.
5.) Align the connector with the probe port and carefully push into place.
6.) Turn the connector locking handle clockwise to secure the probe connector.
7.) Carefully position the probe cable in the probe cord holder spot so it is free to move, but not resting on the floor.

4-3-7-2 Activating the probe

Select the appropriate probe from the probe indicators on the Touch Panel.

The probe activates in the currently-selected operating mode. The probe's default settings for the mode and selected exam are used automatically.

4-3-7-3 Deactivating the probe

When deactivating the probe, the probe is automatically placed in standby mode.

1.) Press the ***Freeze*** key.
2.) Gently wipe the excess gel from the face of the probe. (Refer to the Basic User Manual for complete probe cleaning instructions.)
3.) Carefully slide the probe around the right side of the keyboard, toward the probe holder. Ensure that the probe is placed gently in the probe holder.

4-3-7-4 Disconnecting the probe

Probes can be disconnected at any time. However, the probe should not be selected as the active probe.

1.) Move the probe locking handle counterclockwise. Pull the probe and connector straight out of the probe port.
2.) Carefully slide the probe and connector away from the probe port and around the right side of the keyboard. Ensure the cable is free.
3.) Be sure that the probe head is clean before placing the probe in its storage box.

4-3-8 Using Cine

4-3-8-1 Activating CINE

Press **FREEZE**, then roll the **TRACKBALL** to activate CINE. To start CINE Loop playback, press Run/ Stop. To stop CINE Loop playback. press Run/Stop.

4-3-8-2 Omitting Images

TRACKBALL to the frame you want to delete and press OMIT IMAGE.

4-3-8-3 Restoring Images

To undo deleting an image from the CINE Loop, press RESTORE IMAGE.

4-3-8-4 Quickly Move to Start/End Frame

Press FIRST to move to the first CINE frame; press LAST to move to the last CINE frame.

4-3-8-5 Start Frame/End Frame

Turn the **START FRAME** dial to the left to move to the beginning of the CINE Loop. Turn the dial to the right to move forward through the CINE Loop.

Turn the **END FRAME** dial to the right to move to the end of the CINE Loop. Turn the dial to the left to move backward through the CINE Loop.

4-3-8-6 Adjusting the CINE Loop Playback Speed

Turn the **LOOP SPEED** dial right/left to increase/decrease the CINE Loop playback speed.

4-3-8-7 Synchronizing Multiple CINE Loops

To synchronize two or more CINE Loops, press SYNC MODE.

4-3-8-8 Disconnecting B-Mode CINE from Timeline CINE

To review the B-Mode CINE Loop only, press CINE MODE SELECTION and select B ONLY.

To review the Timeline CINE Loop only, press CINE MODE SELECTION and select TL ONLY.

To return to linked B-Mode and Timeline CINE Loop review, press CINE MODE SELECTION and select B/TL.

4-3-8-9 Moving through a CINE Loop Frame By Frame

Turn **FRAME BY FRAME** to move through CINE memory one frame at a time.

4-3-9 Image Management (QG)

For Image Management functionality refer to the LOGIQ™ 9 Quick Guide. It talks about several topics:

- Clipboard
- Printing Images
- Browsing and Managing an Exam's Stored Image
- Connectivity, and Dataflow Concept and Creation
- Starting an Exam
- Configuring Connectivity
- TCP/IP
- Services (Destinations)
- Buttons
- Views
- Verifying and Pinging a Device

4-3-10 Using the MOD (Magneto-Optical Drive)

The 3.5 inch Magneto-Optical disk drive supports the following densities:

Standard: 640MB; 540MB; 230MB; and 128MB

Overwrite: 640MB; and 540MB

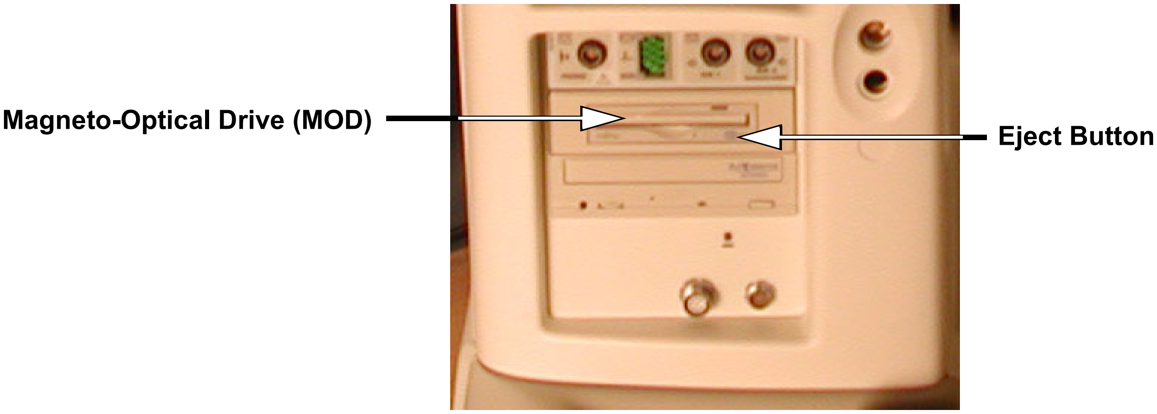


Figure 4-10 Magneto-Optical Drive

1.) Before installing an MO disk in the MOD, check the MO disk for loose hardware or damaged labels which could jam inside the MOD. Also, ensure that the slide switch in one corner of the disk is set so that the disk is write enabled (disk hole closed).
2.) Insert the disk into the MOD with the label facing up.

NOTICE **Never move the unit with a disk in the MOD because the drive actuator will not be locked and the MOD could break.**

3.) There are different methods to eject a disk from the MOD. In some cases disk ejection is automatic. Manual ejection methods are listed below in preferred order from best (1) to worst (4).
    a.) When in Archive Menu, use the softkey choice –or– click Image Presets up, then click the left softkey switch up for ARCHIVE, then toggle the switch under EJECT MOD.
    b.) Press the **EJECT** switch on the MOD while system is ON.
    c.) Press and hold the **EJECT** switch while the system is booting.
    d.) Mechanical ejection. Insert the end of a paper clip into the hole next to the **EJECT** switch while system power is OFF.

NOTICE **Avoid mechanical ejection whenever possible. Mechanical ejection leaves the actuator unlocked and the MOD susceptible to damage if moved. If forced to use this method, reboot the system, then insert and eject a known good disk using one of the other manual ejection methods.**

4-3-11 Backup and Restore Database, Preset Configurations and Images

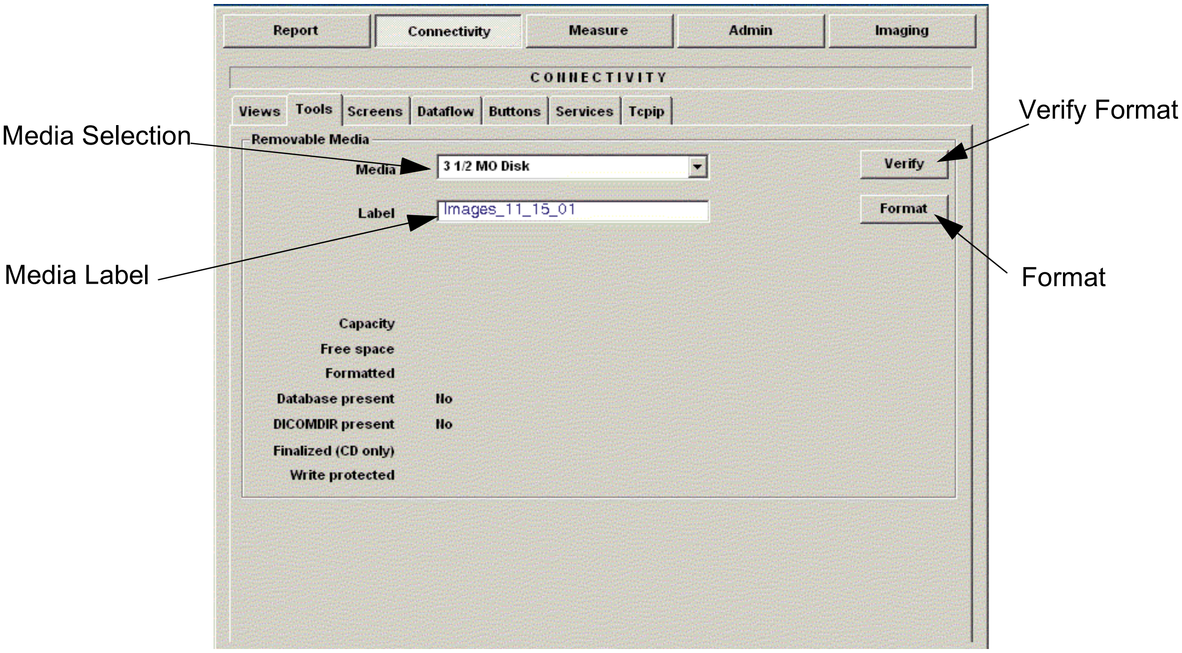
4-3-11-1 Formatting Media

1.) To format the backup media, CD-ROM or MOD, select the UTILITY tab on the Touch Panel.

2.) Select CONNECTIVITY, then TOOLS. Properly label and Insert the backup media.

3.) Select the media type from the drop down menu.

4.) Enter the label for the media as shown in Figure 4-11. It is best to use all capital letters with no spaces or punctuation marks.



Media: 3 1/2 MO Disk
Label: Images_11_15_01
Capacity
Free space
Formatted
Database present: No
DICOMDIR present: No
Finalized (CD only)
Write protected

Figure 4-11 Format and Verify Media

5.) The Ultrasound system displays a pop-up menu, as shown in Figure 4-12. When the formatting has been completed, press OK to continue.

6.) If desired, verify that the format was successful by returning to *Utility>Connectivity>Tools* and selecting VERIFY as shown in Figure 4-11.

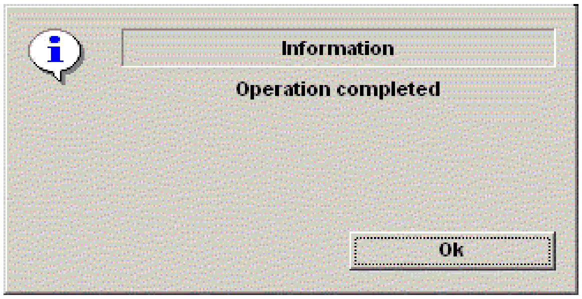

Information
Operation completed

Figure 4-12 Format Successful Pop-up Menu

4-3-11-2 Backup System Presets and Configurations

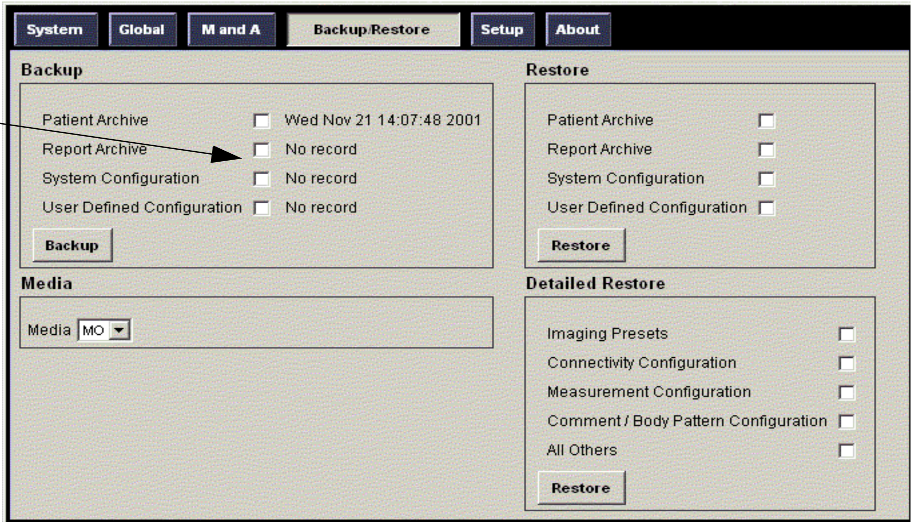
NOTE: *Always backup any preset configurations before a software reload. This ensures that if the presets need to be reloaded, after the software update, they will be the same ones the customer was using prior to service.*

1.) Insert a formatted MOD (Magneto-Optical Disk) or CD-R into the drive.
2.) On the Touch Panel, press UTILITY.
3.) On the Utility Touch Panel, press SYSTEM.
4.) On the monitor display, select BACKUP/RESTORE.

NOTE: *If you are not logged in as GE Service or with administrator privileges, the Operator Login window is displayed. Log on with administrator privileges.*

5.) In the Backup list, select Patient Archive, Report Archive, System Configuration and User Defined Configuration.
6.) In the Media field, select MO or CD-RW.
7.) Select BACKUP.

The system performs the backup. As it proceeds, status information is displayed on the Backup/Restore screen.



Check here to backup presets and configurations

Backup

Patient Archive ☐ Wed Nov 21 14:07:48 2001
Report Archive ☐ No record
System Configuration ☐ No record
User Defined Configuration ☐ No record

Media

Media MO

Restore

Patient Archive ☐
Report Archive ☐
System Configuration ☐
User Defined Configuration ☐

Detailed Restore

Imaging Presets ☐
Connectivity Configuration ☐
Measurement Configuration ☐
Comment / Body Pattern Configuration ☐
All Others ☐

Figure 4-13 Backup/Restore Menu

4-3-11-3 Restore System Presets and Configurations

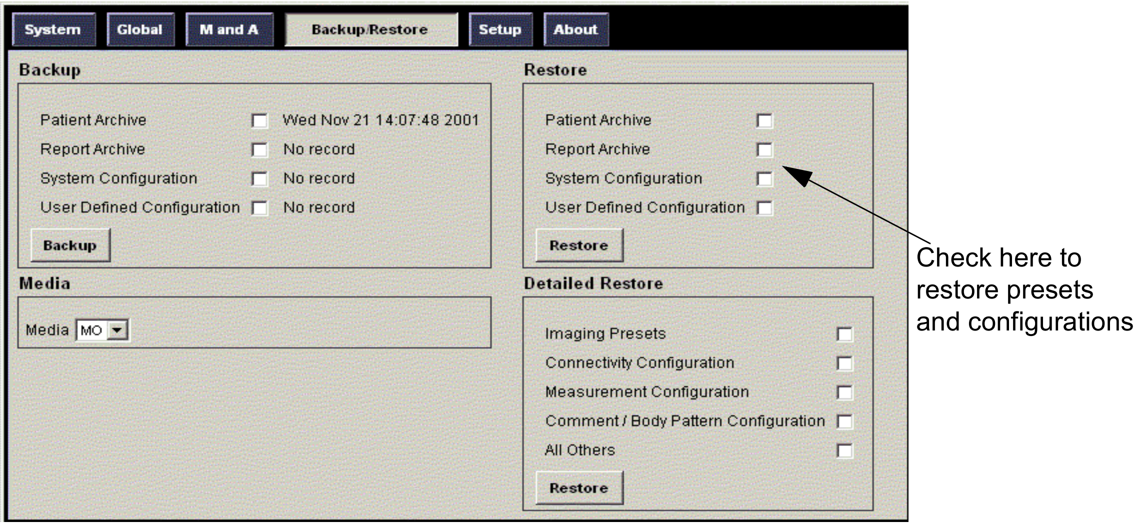
CAUTION The restore procedure **overwrites** the existing database on the local hard drive. Make sure to insert the correct MOD or CD-R.

1.) Insert the Backup/Restore MOD (Magneto-Optical Disk) or CD-R into the drive.
2.) On the Touch Panel, press UTILITY.
3.) On the Utility Touch Panel, press SYSTEM.
4.) On the monitor display, select BACKUP/RESTORE.

NOTE: If you are not logged in with administrator privileges, the Operator Login window is displayed. Log on with administrator privileges.

5.) In the Restore list, select Patient Archive, Report Archive, System Configuration and User Defined Configuration.
6.) In the Media field, select the Backup/Restore MOD or CD-RW.
7.) Select RESTORE.

The system performs the restore. As it proceeds, status information is displayed on the Backup/Restore screen.


System
Global
M and A
Backup/Restore
Setup
About
Backup
Patient Archive ☐ Wed Nov 21 14:07:48 2001
Report Archive ☐ No record
System Configuration ☐ No record
User Defined Configuration ☐ No record
Backup
Media
Media MO
Restore
Patient Archive ☐
Report Archive ☐
System Configuration ☐
User Defined Configuration ☐
Restore
Detailed Restore
Imaging Presets ☐
Connectivity Configuration ☐
Measurement Configuration ☐
Comment / Body Pattern Configuration ☐
All Others ☐
Restore

Check here to restore presets and configurations

Figure 4-14 Backup/Restore Menu

4-3-11-4 Archiving Images

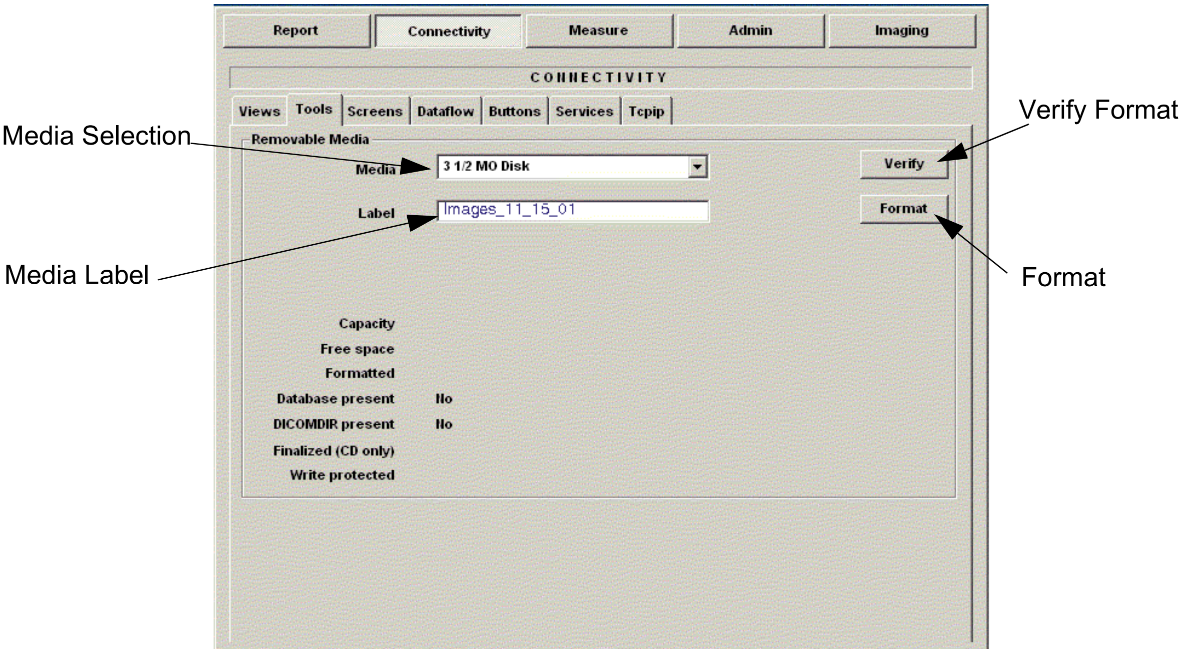
1.) Insert the archive media. To format the archive media, CD-ROM or MOD, select the Utility tab on the Touch Panel.

2.) Select Connectivity, then Tools.

3.) Format the MOD/CD-ROM. Verify the format if desired.

4.) Images will be moved from the hard drive by date. Therefore, the best way is to label media by date.

NOTE: Images will be moved from the hard drive by date. Therefore, the best way to label media is by date. When images are moved to the archive media, they will be deleted from the system hard drive. However, the patient database (backed up earlier) maintains pointers to the location of the images on the archive media.



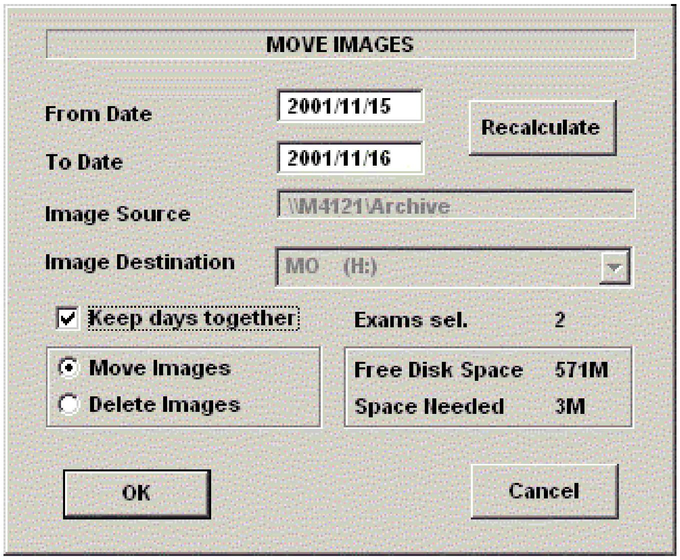
Media: 3 1/2 MO Disk
Label: Images_11_15_01
Database present: No
DICOMDIR present: No

Figure 4-15 Format MOD/CD-ROM Screen

5.) Press PATIENT and set the Dataflow to store images directly to MOD or CD-ROM.

6.) From the image screen, press MORE, then select Move Images. The Move Images pop-up appears.

4-3-11-4 Archiving Images (cont'd)



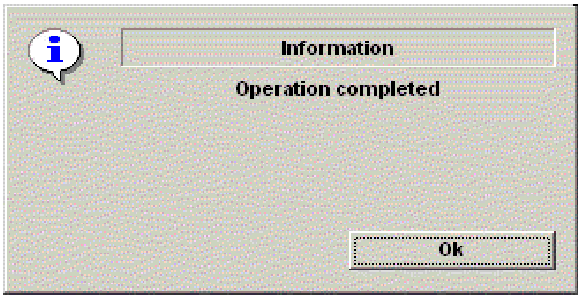
From Date 2001/11/15
To Date 2001/11/16
Image Source \\M4121\Archive
Image Destination MO (H:)
☑ Keep days together
Exams sel. 2
● Move Images
○ Delete Images
Free Disk Space 571M
Space Needed 3M

Figure 4-16 Image Archive Move Pop-up Menu

7.) Fill in the *From Date* and *To Date*. Specify to *Keep days together*.

8.) Press RECALCULATE.

9.) Press OK. An in-progress message appears. The archive operation is complete when you receive the message shown in Figure 4-17.



Operation completed

Figure 4-17 Archive Operation Complete Message

10.) Repeat the image move steps until all images have been archived.

All databases, presets and images should now be saved to removable media.

4-3-12 ECG Check Out (this option is currently not available on the LOGIQ™ 9

Connect the ECG Harness and check:

Table 4-5 ECG Harness Check

Step	Task to do	Expected Result(s)
1.	Connect the ECG at the Connector on the Front of the scanner.	It will display a curve along the bottom edge of the image sector

Section 4-4
Software Configuration Checks

Table 4-6 Software Configuration Checks

Step	Task to do	Expected Result(s)
1.	Check Date and Time setting	Date and Time are correct
2.	Check that Location (Hospital Name) is correct	Location Name is correct
3.	Check Language settings	Desired Language is displayed
4.	Check assignment of Printer Keys	Print1-4 Keys are assigned as desired by the customer
5.	Check that all of the customer's options are set up correct	All authorized functions are enabled

Section 4-5
Peripheral Checks

Check that peripherals work as described below:

Table 4-7 Peripheral Checks

Step	Task to do	Expected Result(s)
1.	Press (**FREEZE**)	Stop image acquisition.
2.	Press (**PRINT 1**) or (**PRINT 2**) on the Control Panel	The image displayed on the screen is printed on B&W or Color printer, depending on the key assignment configuration
3.	Press **VIDEO** on the Control Panel.	To start the video counter at a different point:
4.	Press **UPDATE MENU** in the Trackball area.	The *Video Set Counter / Search Dialog window* is displayed
5.	Use the **alphanumeric keyboard** to enter the counter number in the counter field.	Number appears
6.	Press **SET COUNTER** to save the change.	Number is saved
7.	Press **VIDEO** on the Control Panel	to return to the scanning mode
8.	Press **REC/PAUSE** on the Control panel.	to Start Recording A red dot is displayed in the *VCR status area* on the *Title bar* to indicate that recording has begun
9.	Press **REC/PAUSE** on the Control panel.	To Stop recording The video status icon is changed to (Pause)
10.	Press VIDEO on the Control Panel and the assignable play	To start, Play back an examination
11.	Use the **Assignable keys** on the *Control Panel*	to perform actions on the recorded session, such as stop, pause, rewind or fast forward. The video status icon in updated accordingly.
12.	While in playback mode, use the **TRACKBALL** to adjust the video playback speed and scroll through the record.	To search on the tape
13.	Press the assignable **PAUSE**	to stop the tape at the desired frame.
14.	When playing back an examination	part of it can be stored on the computer’s memory as a cineloop.The cineloop enables the user to perform further operations on the stored section (see for further information on cineloop operation).
15.	Press (**FREEZE**) while playing back a recorded session.	**To store a recorded sequence as a cineloop. The** last few seconds are stored as a cineloop.

Section 4-6
Mechanical Function Checks

4-6-1 Operator I/O Movement

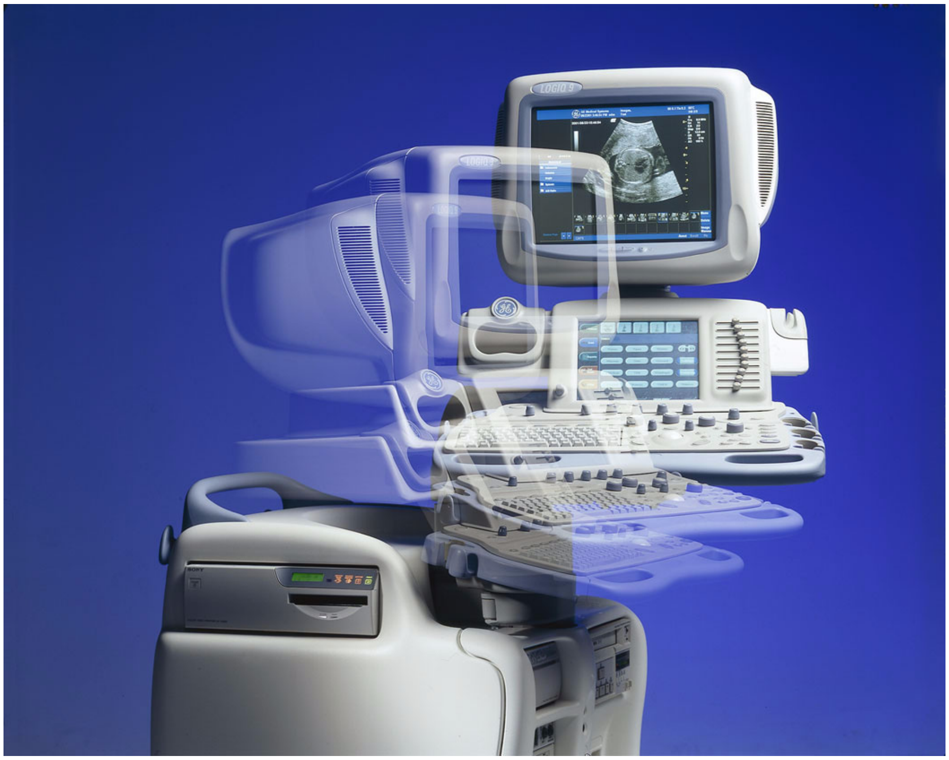


Figure 4-18

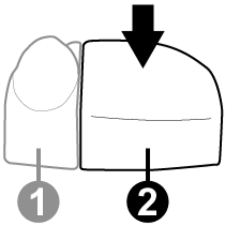
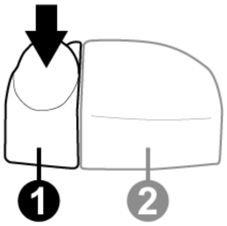
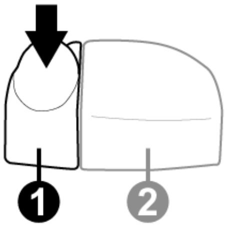
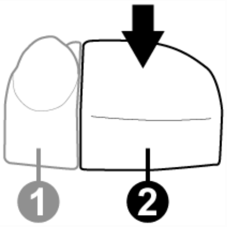
Step	Task	Expected Result(s)
1.	Pull handle up under the platform towards you to release horizontal lock	It is possible to maneuver the Display Platform horizontally at present level of height
2.	Pull handle at left hand grip towards you to release the Vertical Lock	It is possible to maneuver the Display Platform up and down (between the vertical end stops) as long as you pull the handle towards you
3.	Pull both handles towards you to release both Vertical and Horizontal locks	It is possible to maneuver the Display Platform both horizontally and vertically as long as you keep pulling these handles towards you

Table 4-8 Display Platform Maneuverability Checks

4-6-2 Brakes and Direction Locks Checks

Check that the brakes and direction locks function as described below.

Table 4-9 Brakes and Direction Lock Instructions

Step	Task	Expected Result(s)	If Not, Remedy
1.	Press on pedal no. 2  	To engage the brakes in full lock	Test Rods Bolts and nuts and wheel rubber as described in Brake Adjustment on page 6-14.
2.	Press on pedal no.1  	To release the brake	
3.	Press on pedal no.1  	To engage swivel lock. You may need to move the system around a little to get the wheels to lock into the locked direction.	
4.	Press on pedal no. 2  	To release swivel lock	

NOTE: *The swivel lock and brake cannot be engaged (pressed down) at the same time since pressing the main brake releases the swivel lock and pressing the swivel lock releases the main brake. Therefore, if the swivel lock is engaged you need to press the main brake pedal (#2)* ***twice*** *to lock the scanner from rolling. Once will release the swivel lock and once again will engage the main brake in full lock as stated in step 1.*

Section 4-7
Site Log

Table 4-10 Site Log

Date	Service person	Problem	Comments

Chapter 5
Components and Functions (Theory)

Section 5-1
Overview

5-1-1 Purpose of Chapter 5

This chapter explains LOGIQ™ 9's system concepts, component arrangement, and subsystem function. It also describes the Power Distribution System (PDS) and probes.

Table 5-1 Contents in Chapter 5

Section	Description	Page Number
5-1	Overview	5-1
5-2	General Information	5-2
5-3	Front End Processor	5-5
5-4	Back End Processor (BEP)	5-23
5-6	Patient I/O (Currently not supported by the LOGIQ™ 9)	5-36
5-7	Internal I/O	5-37
5-8	Top Console	5-45
5-9	Monitor	5-46
5-10	External I/O	5-46
5-11	Peripherals	5-49
5-12	Modem	5-50
5-13	Power Distribution	5-52
5-14	Mechanical Descriptions	5-57
5-15	Air Flow Control	5-59
5-16	Service Platform	5-59

Section 5-2
General Information

LOGIQ™ 9 is a phased and linear array ultrasound imaging scanner. It has provisions for analog input sources like ECG and Phono. A Doppler probe may also be connected and used.

The system can be used for:

- 2D Gray Scale and 2D Color Flow Imaging
- M-Mode Gray Scale Imaging
- Color M-Mode
- Doppler
- Different combinations of the above modes

LOGIQ™ 9 is a digital beamforming system.

Signal flow travels from the Probe Connector Panel to the Front End Electronics, to the Back-End Processor, and finally displayed on the monitor and peripherals.

System configuration is stored on the hard drive and all necessary software is loaded from the hard drive on power up.

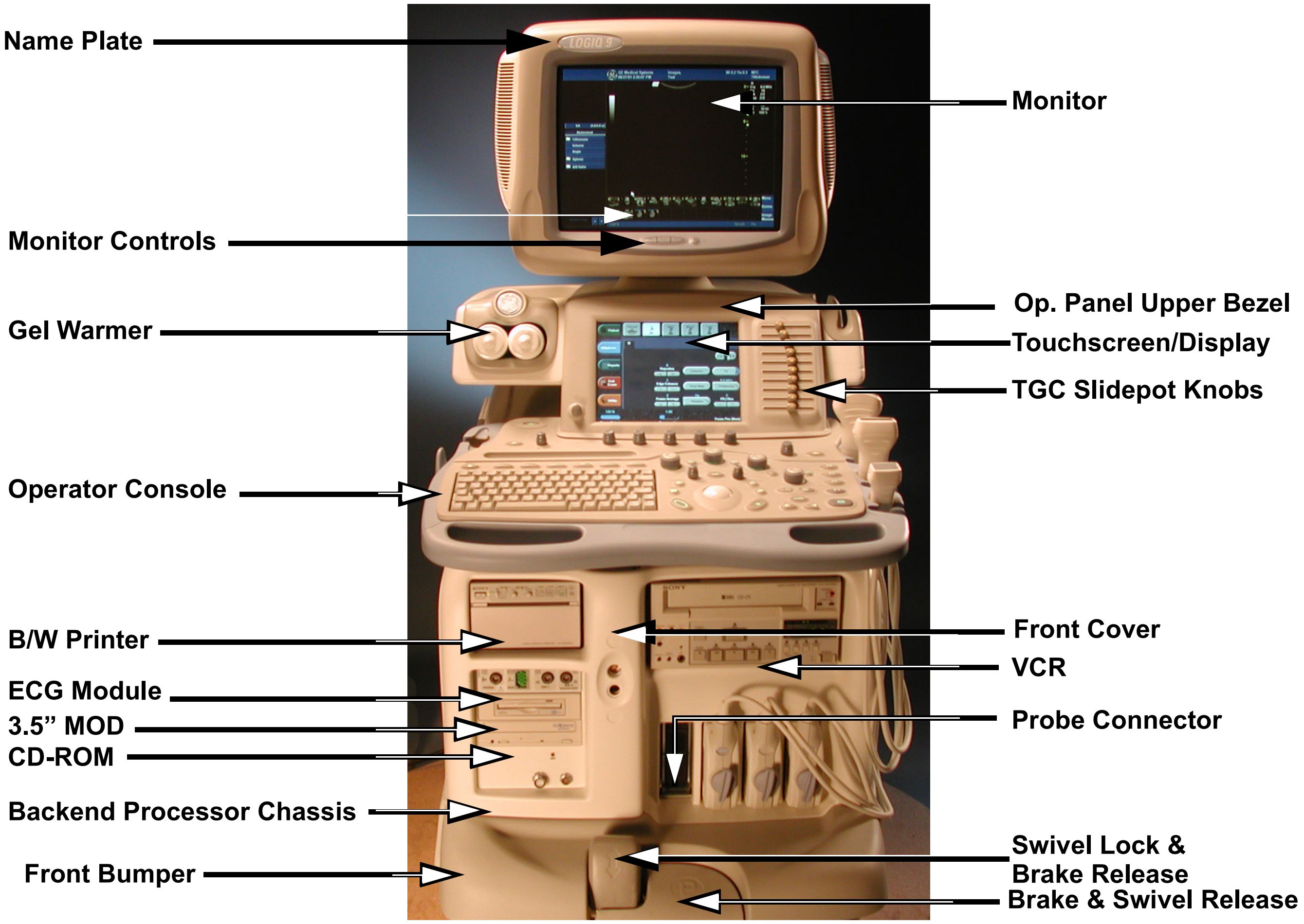


Figure 5-1 LOGIQ™ 9 Major Components

5-2-1 Block Diagram

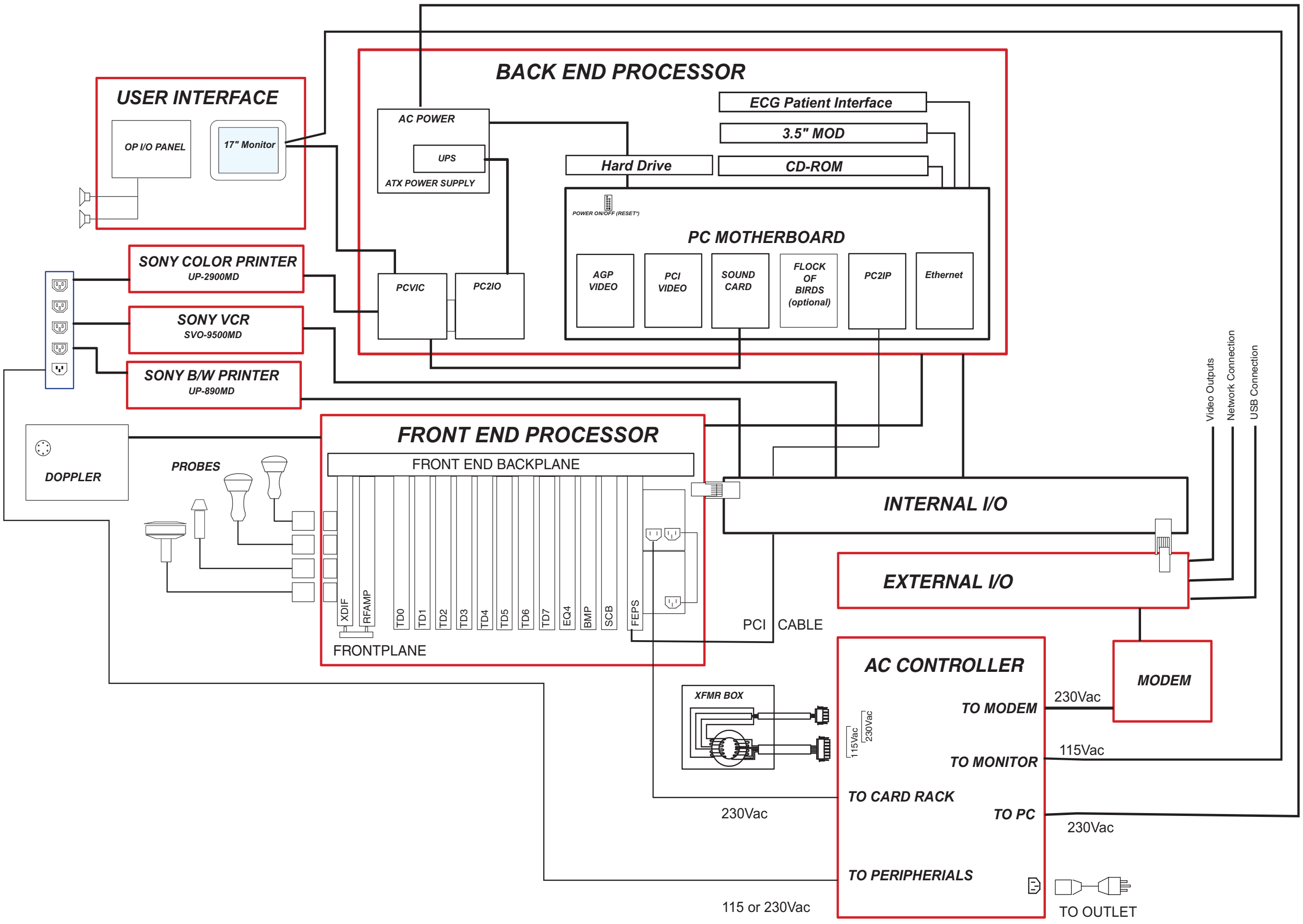


Figure 5-2 LOGIQ™ 9 Simple Block Diagram

5-2-2 Dataflow Control Description

5-2-2-1 Data Sets

Each scan mode will produce data to a corresponding data set in the Image Memory. The data sets are represented in ring-buffers. Each active data set will be allocated to one of the following types of acquisition data:

- 2-D tissue data
- Doppler data
- M-mode data
- 2-D Color flow
- Trace data
- Video Y-component data
- Video UV-component data
- Color M-mode data
- RF data

Section 5-3
Front End Processor

The Front End Processor generates the strong bursts transmitted by the probes as ultrasound into the body. It also receives weak ultrasound echoes from blood cells and body structure, amplifies these signals and converts them to a digital signal.

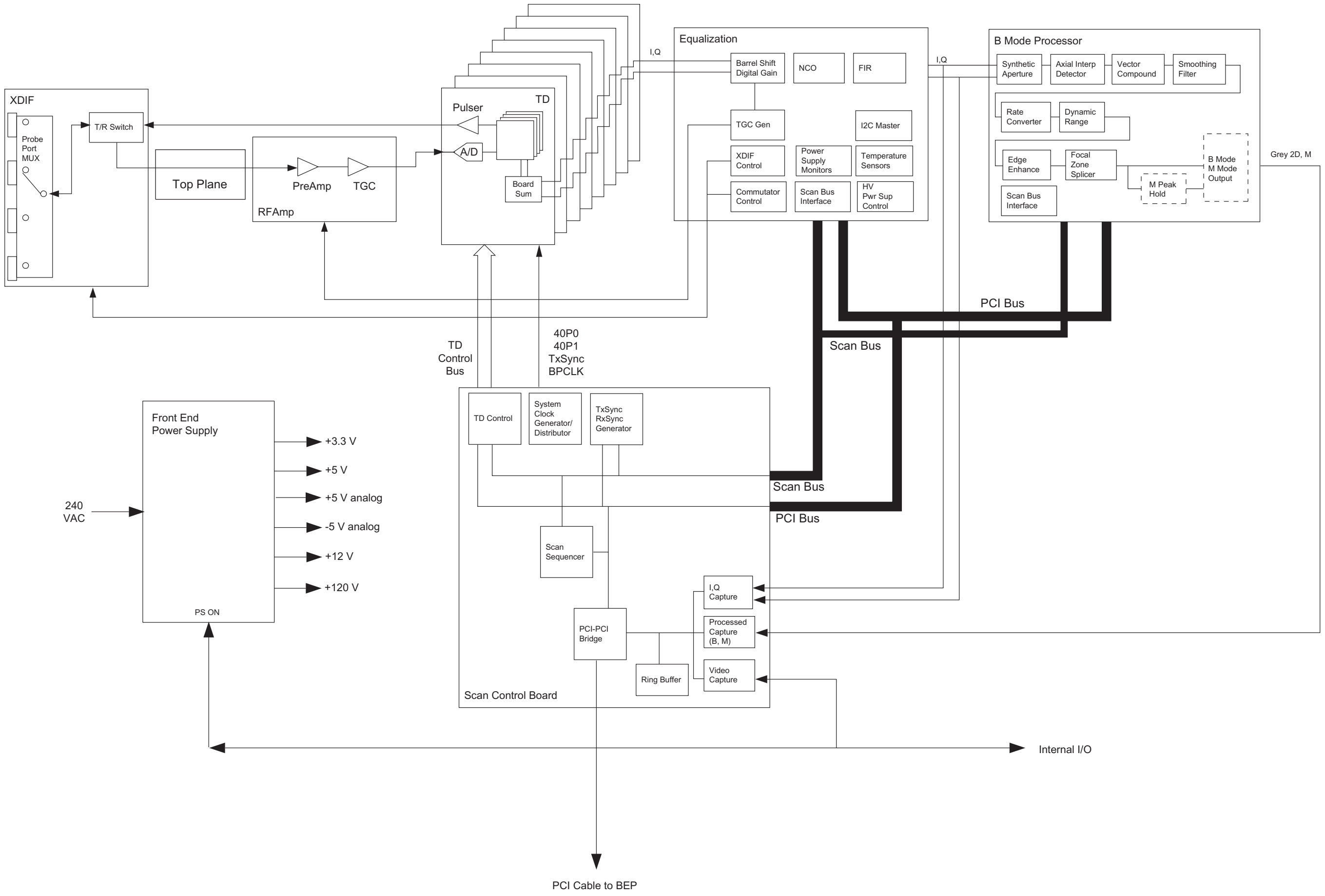


Figure 5-3 The Front End

5-3-1 Front End Processor Power Supply Board (FEPS, FEPS2, FEPS2.1)

The power supply assembly receives approximately 220VAC from the secondary side of the mains isolation transformer.

The FEPS assembly supplies DC regulated power to the Front End card rack of the LOGIQ™ 9. The assembly is configured as a PCB which fits into the right-most slot of the Front End card rack. It interfaces with the back plane to supply power to the Front End circuit boards.

A general enable signal (**PS_ON**) controls enabling and disabling all FEPS Low Voltage outputs. These include +5VA, -5VA, +5V, 3V3, +12V, and +15V (all except PHVP 'High Voltage'). An Enable circuit on the FEPS detects when **PS_ON** becomes valid and holds all outputs off until then.

5-3-1Front End Processor Power Supply Board (FEPS, FEPS2, FEPS2.1) (cont'd)

The high voltage lockout circuit monitors the +5VA, -5VA, +12VA and 3V3 supplies and locks out the PHVP supply in the event that any one of them go below 10% of their nominal value.

PWR_OK is an active high TTL compatible output which provides a status indication of the AC input power. It should be capable of sinking 5mA maximum. The signal switches to a TTL 'High' when the AC input voltage reaches the minimum specified input level at power up. Upon loss of input voltage, **PWR_OK** will go 'Low'.

5-3-1-1 FEPS3

The FEPS3 Board was introduced with R3.0.0 Software and BT'03. It is not backward compatible with prior hardware as it provides the new voltages (+/- 6V and 13V) required by the TD5s and RFAMP2.

Table 5-2 FEPS, Output Comparison

System Name	FEPS, FEPS2, FEPS2.1 Nominal Output	FEPS3 Nominal Output
5VPA	+5.05V	**+6.0V**
5VNA	-5.05V	**-6.0V**
5VP	+5.05V	+5.05V
3V3	3.33V	3.33V
PHVP	+121.2V / +24.2	+121.2V / +24.24V
12VP	12.12	**13.0V**
15VP	+15.15	+15.15

5-3-2 Front End Subsystem

The LOGIQ™ 9 Front End Subsystem consists the XDIF (Transducer Interface) board, RF Amp board and eight TD (Transmit Delay) boards.

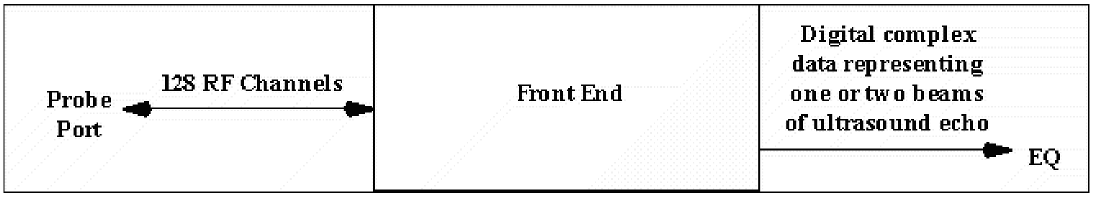

Probe Port
128 RF Channels
Front End
Digital complex data representing one or two beams of ultrasound echo
EQ

Figure 5-4 Basic Front End SubSystem

The Front End Subsystem provides 128 receive and 128 transmit channels as well as gain and bandpass filtering of the received signal.

5-3-2-1 XDIF (Transducer Interface) Board

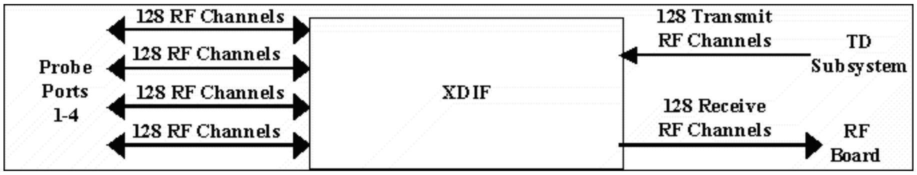


Figure 5-5 XDIF Board Functions

The XDIF supports four 128 Channel probe ports with the ability to select one of the four probe ports. The XDIF supports a probe multiplexer requiring a 200V (+100V and -100V). The multiplexer in the probe will select 128 of the out of up to 192 channels.

The XDIF uses a T/R (Transmit/Receive) switch on each output to the RF Amplifier board. During transmit the T/R switch prevents the high voltage transmit pulser from damaging the receive preamplifier. During receive the T/R switch isolates the receive preamp from the transmit high voltage pulser.

5-3-2-2 Top Plane

Connects the receive signals from the XDIF board to the RF Amplifier board at the front of the circuit boards.

5-3-2-3 RF Amp, RF Amp1.2, RF Amp2 Board (Radio Frequency Amplifier Board

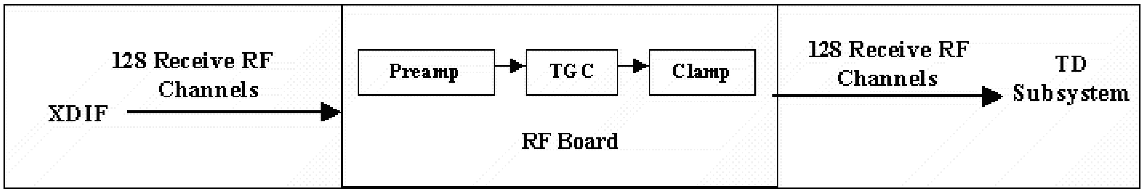


Figure 5-6 RF Amp, RF Amp2 Functions

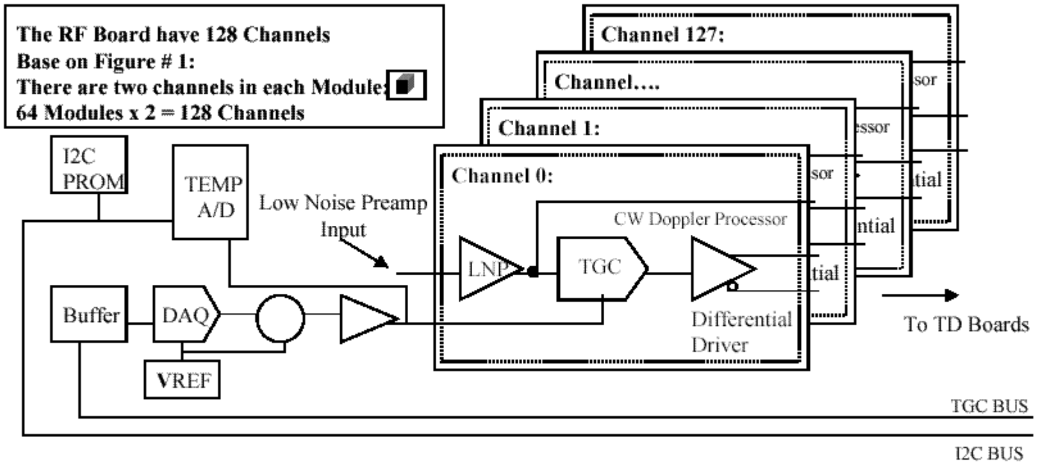


Figure 5-7 RF Amp Board Functional Block Diagram

The RF Amplifier board shall contain 128 channels of the circuitry that is necessary to amplify the small electronic echo signals that are received from the probe transducers. Each channel shall consist of a low-noise, active input termination preamplifier, a time-gain compensation (TGC) amplifier, and a low noise differential drive amplifier (buffer). The RF Amp board shall physically reside in the Beamformer card cage adjacent to the XDIFF board.

The probe level analog input signals shall enter the RF Amp board on a series of board to board connectors that mate the RF Amplifier Board to the XDIFF Board. These connectors carry the transducer level receive signals that originate at the probe and make their way through the probe interface relays, and T/R switches. The digital interface, power supplies, and reference ground shall be provided to the RF Amp board by the system backplane.

Each amplified signal generated by the RF Amp board shall provide a differential output and drive filter circuitry located on the TD boards via the system backplane. The TD boards perform an anti-alias filtering operation and convert the transducer signals to a 12 bit data stream that feeds the digital beamforming electronics.

RF Amp2 Board

The RF Amp2 Board was introduced with R3.0.0 Software and BT'03. It is not backward compatible with prior hardware as it requires the new voltages (+/- 6V and 13V) provided by the FEPS3 Board.

5-3-2-4 TD, TD4, TD5 (Time Delay) Boards (8)

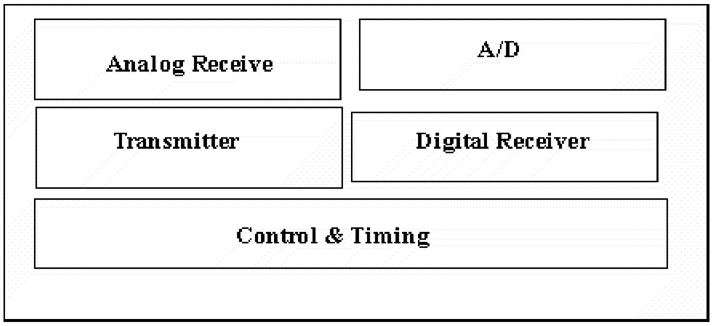


Figure 5-8 Basic TD Board Functions

Major functions of the TD boards are:

- Transmitter
- Analog Receive
- A/D (Analog to Digital conversion)
- Digital Receiver (Rigel Beamformer Chip)
- Control & Timing

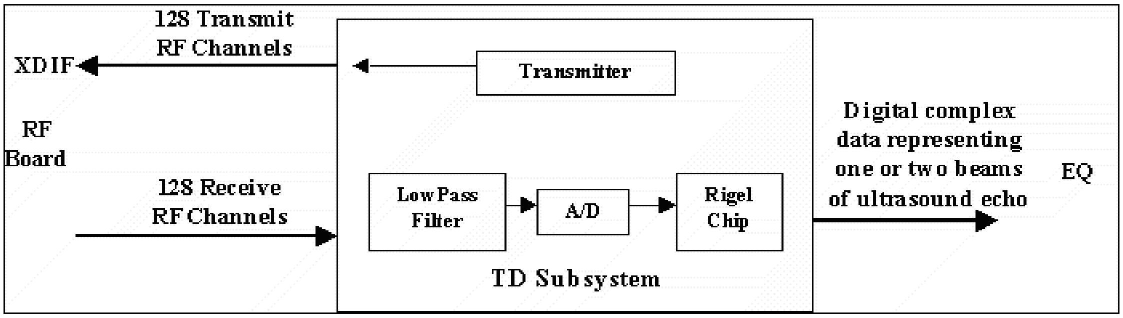


Figure 5-9 Basic TD Input/Output Signals

The TD (Time Delay) boards send 128 transmit signals to the XDIF board. The 128 receive channels from the RF board get low pas filtered, converted from analog to digital and then use the Rigel beamformer chip to generate complex digital data signals representing one or two beams of ultrasound echo information sent to the EQ board.

5-3-2-4TD, TD4, TD5 (Time Delay) Boards (8) (cont'd)

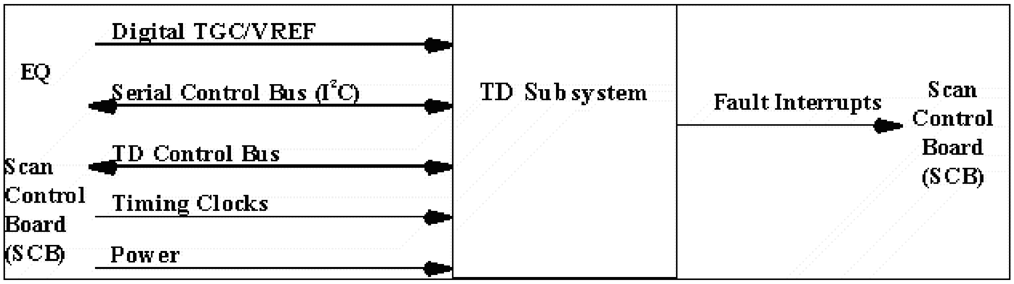


Figure 5-10 Basic TD Input/Output Control Signals

Major control siganal from the EQ board are the Digital TGC/VREF and Serial Control Bus (I^{2}C). Control signal between the Scan Control board consist of Power, Timing Clocks, TD Control Bus and Fault Interrupts

Time Delay (TD, TD4, TD5) Board Function Summary:

- Each board assigned to a subset of 16 channels.
- Generates and amplifies the excitation waveform for each channel.
- Digitizes the input RF signal from the RF Amplifier board.
- Applies dynamic apodization, dynamic receive delays, and filters to the digitized RF signal.
- Automatically adapts receive beams for speed or resolution depending on scans.
- Sums detected echo channel to channel, then board to board. (Boards must be contiguous.) The last TD forwards the total output to the EQ.
- Monitors current consumed for transmit and issues a fault signal if overcurrent is detected.

TD5 (Time Delay 5)

The TD5 Board was introduced with R3.0.0 Software and BT'03. It is not backward compatible with prior hardware as it requires the new voltages (+/- 6V and 13V) provided by the FEPS3 Board.

5-3-3 Scan Control Board (SCB, SCB2)

The Scan Control Board combines onto one board the basic functionality of Image Port (IP), Front End Control and Timing (FECT), Scan Sequencer (SS2) and the Scan Trigger (System Timing).

A PCI Slave provides communication to the Scan Control Board. The Scan Control Board only supports 64 MB of image memory. The IP2 section of the board serves as an interface for B- and M-Mode image data, video data, and raw I/Q data to be ported to the PC for scan conversion or for further image processing, as in the case of the I/Q data. The image data received from the BMP board will be in a standard eight-bit grayscale format while the I/Q data is received in 16-bit multiplexed data format.

The data on each path will be converted to the PipeLink Format within the IP2 section of the board. The FECT section of the board is the master source of timing generation for the entire system. Additionally, it provides the address generation, MUX and interface control for the Time Delay (TD) board during Host accesses and channel memory to RIGEL register transfer mode.

The SS2 section of the board performs vector scan control sequencing and interfaces the scan bus to the rest of the system. Each of the four functional blocks will be described at a requirements and functional specification level in future sections.

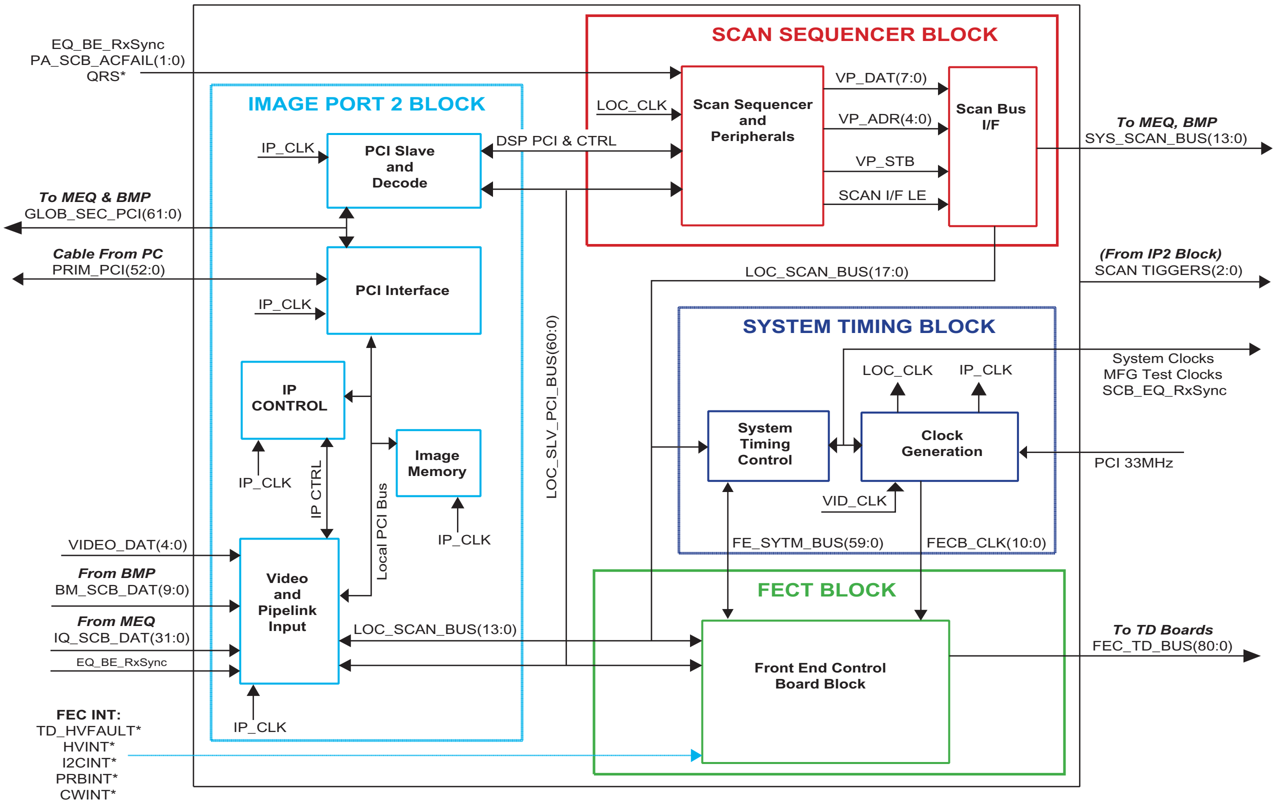


Figure 5-11 SCB Simplified Block Diagram

5-3-3-1 SCB, SCB2 High Level Features

- Generates and buffers system clocks:
  - 40 MHz (40P0 and 40P1)
  - 10 Mhz (BPCLK)
  - TXSync
  - RxSync
- Configures the beamformer to fire B/M-Mode, Color, or PW Doppler vectors.
- Controls scan sequencing in real-time; setting the vector firing order and timing intervals.
- PCI interface to Back End Processor (BEP), BMP, and EQ or EBM/EBM2.
- Buffers B/M data from BMP/EBM/EBM2, data from the EQ/EBM/EBM2 (for Color and PW Doppler), and video data from the VCR to transmit to the BEP for software processing and display.
- Interface between Host PCI and TD boards.

5-3-3-2 Compatibility

Only SCB2 Boards should be used with R3.0.0 software and greater

5-3-3-3 Scan Control Board LEDs

Table 5-3 SCB LED Indications

Function Monitored	LED Number	LED Color	LED Function
I960 Processor	DS1	Red	i960 Fail
	DS2	Yellow	i960 Local Bus Activity
Image Port	DS3	Red	Toggles during Image Port Frames
	DS4	Green	Toggles during Image Port Frames
	DS5	Yellow	IP Master Enable
	DS6	Yellow	IP Master Ready
Pipelink	DS7	Red	IQ Left FIFO Error
	DS8	Red	IQ Right FIFO Error
	DS9	Red	BM FIFO Error
	DS10		FIFO’s Empty
Scan Sequence	DS11	Red	Crash
	DS12	Yellow	FIFO Error
	DS13	Yellow	Command Pulse
	DS14	Yellow	Unused
	DS15	Yellow	Pause
	DS16	Green	Unused
	DS17	Green	Happy Light - Toggles during Scan Sequence
	DS18	Green	Happy Light - Toggles during Scan Sequence

Table 5-4 SCB2 2365739 LED Indications

LED Number	LED Color	LED Function
DS1	Green	FPGA Programming Done (Passed)
DS2	Red	i960 Fail
DS5	Green	Toggles during Image Port Frames
DS6	Red	Toggles during Image Port Frames
DS7	Red	Crash
DS8	Yellow	FIFO Error
DS9	Yellow	Command Pause
DS10	Yellow	Unused
DS11	Yellow	Pause
DS12	Green	Unused
DS13	Green	Happy Light (toggles during Scan Sequence)
DS14	Green	Happy Light (toggles during Scan Sequence)

5-3-4 Equalization (EQ) Board

5-3-4-1 General Description

The EQ dynamically gains and filters the received signal output from the final beamformer sum. TGC control calculates range dependent analog and digital gains. The digital gain is applied to the I/Q signal. The gained signal is then rotated in frequency to place the frequency of interest in the passband of the subsequent FIR lowpass filter. The rotator center frequency may also be range dependent. These controls, and the selection of the FIR coefficients may also be processing bank, vector number, or transmit focal zone dependent.

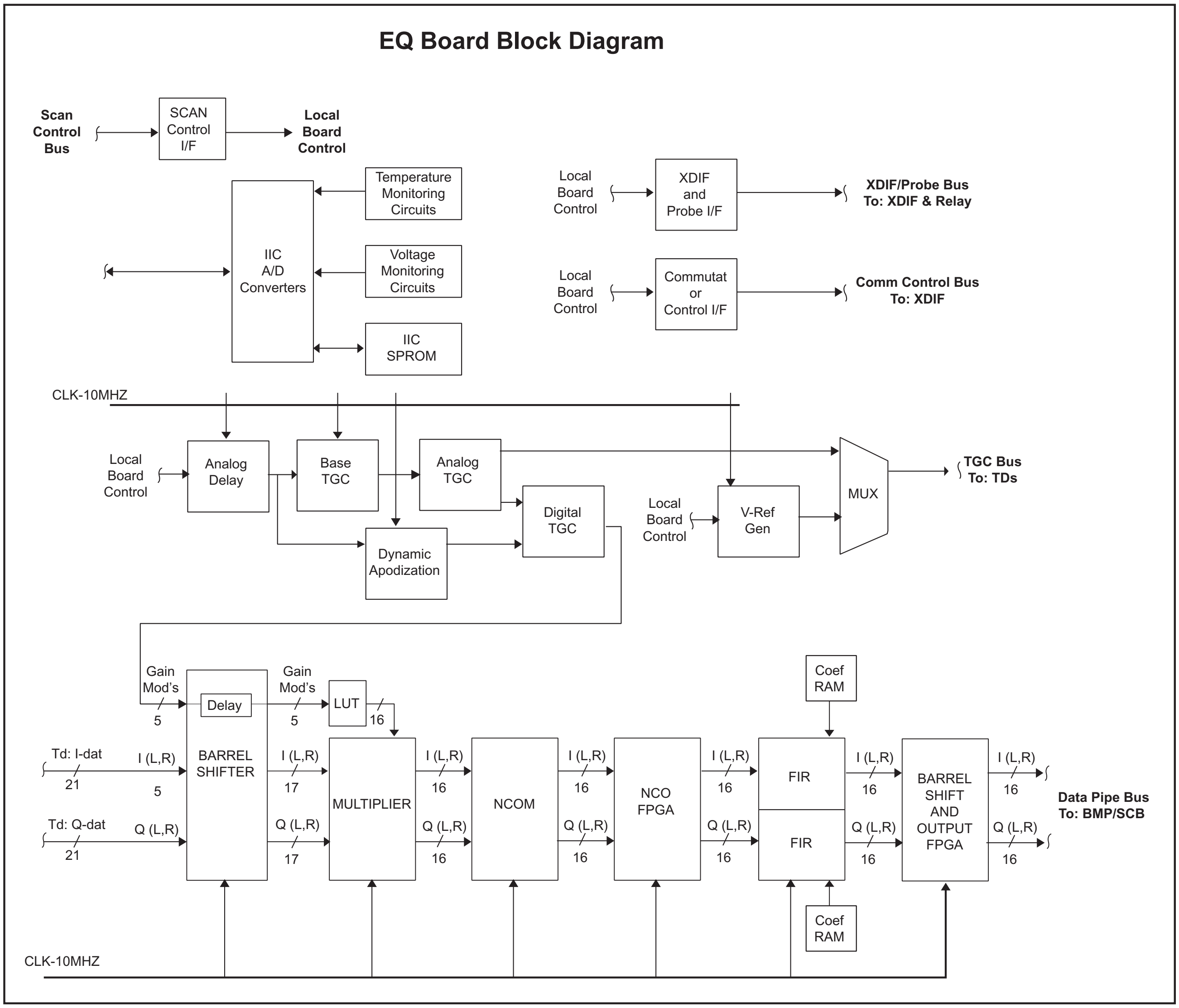


Figure 5-12 EQ Board Block Diagram

5-3-4-2 Basic Functions

- Compensates for the attenuation of the transmitted signal in tissue by depth: performs TGC based on focal zone.
- Compensates for frequency shift (TFC) in tissue, needed in B-Mode and M-Mode.
- Filters out harmonics and optimizes signal to noise ratio.
- Delivers amplified and corrected I & Q data to the BMP and the Scan Control Board.
- Interfaces probe detection and probe ID signals between the XDIF and the host.
- Controls transducer commutator (multiplexer) for muxed probes with more elements than channels in the beamformer.
- Monitors active probe temperature.
- Masters the front end (FE) I2C busses for voltage and temperature monitoring.
- Turns off PHVP on the cardrack power supply if a TD board pulls too much power or malfunctions.

5-3-4-3 Data I/O

The EQ signal input shall be two’s complement I and Q data busses input from the final summer of the beamformer. The EQ I and Q inputs shall be 24-bits wide each, including the sign bit. The EQ outputs shall be 16 bits wide each, including the sign bit.

5-3-4-4 Control I/O

Scanning control shall be provided by the scan bus. Configuration control shall be provided by a PCI bus.

Timing control shall be provided such that all range dependent functions modify data at the correct range. This requires two programmable delays times: analog delay, and digital delay. The range dependent sfunctions include TGC, and TFC.

5-3-4-5 Analog Delay

The EQ use a programmable “analog delay” to time the start of TGC generation from TXSYNC (the start of transmit). This will be set according to the time from TXSYNC until range 0 echoes arrive at the phase center channel analog TGC amplifiers. Latencies will be considered when setting this analog delay to insure that the analog gain is applied to the received signal for the intended range.

5-3-4-6 Digital Delay

The EQ uses a programmable “digital delay” to time the application of all range dependent functions on the EQ. This will be set according to the time from RXSYNC (the beginning of a receive vector) until range 0 echoes arrive at the EQ input. Normally this will be set to zero since vectors usually start with range 0; however, virtual apex vector normally start vectors on a curved surface above the actual range 0.

The EQ shall additionally delay all range dependent functions equal to the relative delay of the data, to insure that the range dependent data and functions are aligned.

5-3-4-7 Modes of Operation

The VEQ signal processing shall support two modes of operation: 10 MHz left only, and 5 MHz interleaved left/right. In the 10 MHz left only mode the I/Q data will represent a single (left) beam sampled at 10 MHz. In the 5 MHz interleaved left/right mode, the I/Q data will contain samples for a first beam (left) interleaved with those of a second beam (right), where each is sampled at 5 MHz.

These modes of operation will normally be associated with different display modes. The 10 MHz left only mode will most commonly be used for 2D B or M-mode. The 5 MHz interleaved left/right will most commonly be used for colorflow, and the 5 MHz left only, for Doppler.

5-3-4-8 Signal Processing

The signal path includes TGC (time gain compensation) followed by TFC (time frequency compensation). All reductions in data precision are done via rounding. Overflows are prevented by providing clamping when necessary.

5-3-4-9 Time Gain Compensation (TGC)

The TGC block provides analog gain control to the frontend analog signal path and applies digital gain to beamformer output signal. The maximum signal of the TGC is limited only by the 16-bit output and the 24-bit input. There are not any internal reduction to less than what can be supported by the input and output data widths. The EQ TGC shall include three gain functions:

- **Range Dependent Base TGC**. The TGC gain shall include a range dependent base TGC to compensate for transmit and receive diffraction and round trip attenuation.
- **Vector Gain Offset**. The vector gain offset provides compensation for intensity variations as a result of steering and elemental directivity.
- **Vector and Range Dependent Dynamic Apodization Compensation Gain**. A range and vector dependent function shall adjust the digital TGC to compensate for dynamic receive apodization. Adjusting gain inversely proportional to the aperture size maximizes dynamic range by fixing the relationship between maximum beamformer output and maximum EQ signal across all vectors, and during reception while analog gain is ramping up.

After TGC, a frequency rotator (numerically controlled oscillator mixer) will shift the I and Q data desired frequency band to baseband. The frequency shift will vary with range to track the band shift due to attenuation. It will also account for non-destructive aliasing which has already taken place in the beamformer.

A real coefficient lowpass FIR will provide increased SNR, fundamental rejection for harmonics, and decoding for coded excitation. Since it is a real filter, I and Q will be filtered identically.

5-3-5 B/M Mode Processor (BMP) Board

5-3-5-1 General Description

The B/M-mode Processor (BMP) subsystem takes the digital complex data from the EQ subsystem and converts it to either B-mode (2D) or M-mode (timeline) data.

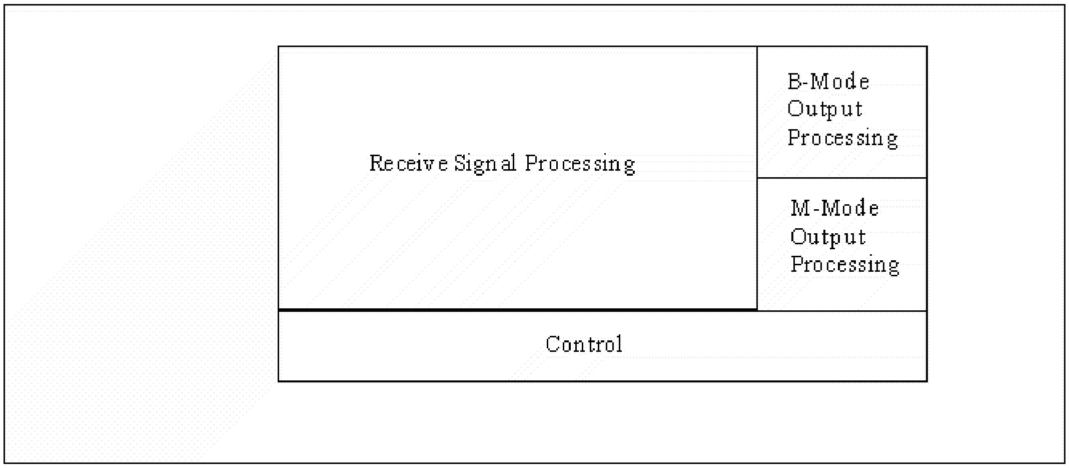


Figure 5-13 BMP Internal Functions

- Processes I & Q data for B-Mode and M-Mode imaging.
- Calculates echo signal’s amplitude.
- Converts sample rate to display rate.
- Implements dynamic range and edge enhancement.
- Splices multiple focal zones into one image.
- Sends processed B/M data to the Scan Control Board.

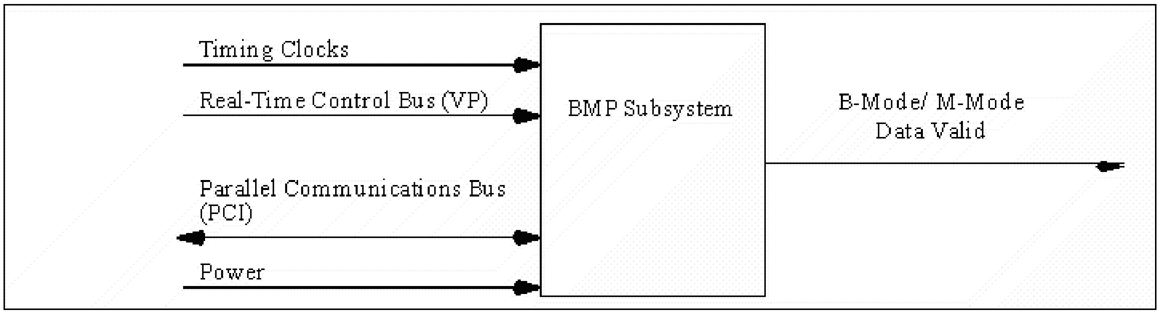

Timing Clocks
Real-Time Control Bus (VP)
Parallel Communications Bus (PCI)
Power
BMP Subsystem
B-Mode/ M-Mode Data Valid

Figure 5-14 BMP Control Inputs/Outputs

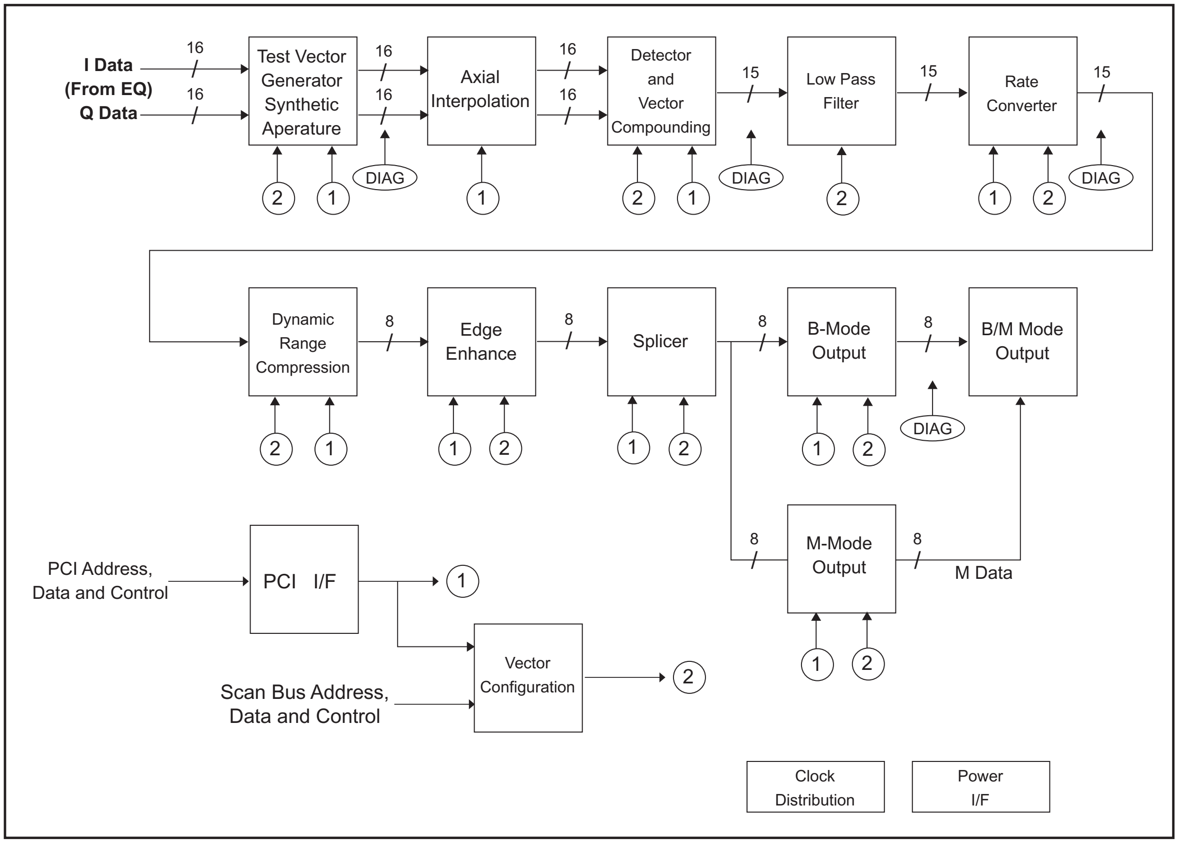


Figure 5-15 BMP Top Block Diagram

5-3-5-2 Receive Signal Processing

The receive signal processing function performs the majority of the data processing within the BMP subsystem. The incoming digital complex data is processed for use with the B-Mode or timeline (M-Mode) outputs.

The receive signal processing is functionally partitioned into the synthetic aperture, axial interpolation, detector and compounder, smoothing filter, rate converter, dynamic range compression, edge enhance and splicer blocks as shown in Figure 4. The lateral spatial filter is needed when 2-for-1 b-mode imaging is implemented.

5-3-5-2Receive Signal Processing (cont'd)

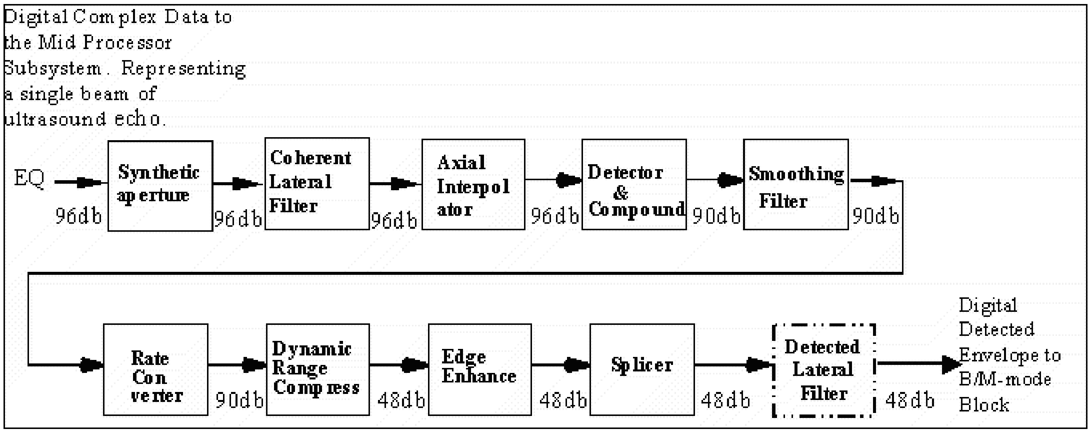


Figure 5-16 Receive Signal Processing

- **Synthetic Aperture** - In synthetic aperture mode, multiple firings from different sets of transducer elements are summed to form a single coherent vector. Control of the summing process is provided by scan control parameters. The accumulate and synthesis (sum) operations are also used for B-Flow data processing.
- **Coherent Lateral Average (Shared Service)** - The lateral average block applies a 2-point or 3-point box-car average from vector to vector. In 1:1 imaging mode, this can produce some SNR gain and restrict lateral spatial bandwidth prior to detection. More importantly, the lateral averaging is needed in 2:1 mode to smooth out the differences between Left and Right beams. This feature is not required until the shared service release.
- **Axial Interpolator** - The axial interpolator function is applied along each vector to double the data sampling rate prior to envelope detection. This is done to prevent axial signal aliasing after the nonlinear detection process. The system provides an enable signal to turn on this 2x axial interpolation.
- **Detector and Compounder** - The purpose of the detector is to compute the polar magnitude of the complex I/Q data. The detector output is passed into a vector compounder which can reduce speckle by summing up multiple receive vectors along each scan line. The vector compounder can be used in conjunction with the synthetic aperture block. That is, a vector finally output from the compounder may be the accumulation of up to 32 input vectors (4 vectors compounded – each of which being an accumulation of 8 vectors in the synthetic aperture block.). The vector compounder shall support bypass vectors and accumulated vectors in the same scan sequence, with gain only applied to the accumulated vectors.
- **Smoothing Filter** - The smoothing filter serves primarily as an anti-aliasing filter before rate conversion, though it may also be viewed as an axial compounding device for speckle reduction.
- **Rate Converter** - The purpose of the rate converter is to reduce the size of the received vector to that allowed by the PC backend. The rate conversion shall be by means of a cubic interpolator. Each output sample is produce from the nearest four input range samples. The coefficients used are a function of the output samples fractional position between input range samples. The rate converter FIFO and associated counter shall support a 36 cm display depth.
- **Dynamic Log Compress** - The purpose of the dynamic log compress is to map the input dynamic range (90 dB) to a display dynamic range (48 dB) suitable for human perception. The input dynamic range is reduced, while the input noise threshold is raised with increasing depths. The goal is to improve image perception degraded by signal loss at greater depths. The dynamic range compression shall provide a precision of 0.25 dB in offset and range (gain).

5-3-5-2Receive Signal Processing (cont'd)

- **Edge Enhance** - The edge enhance filter block enhances the high frequency components of high amplitude signals corresponding to edges of structures. The filter coefficients will vary with different rate conversion on B or M vectors, due to depth or display size differences (including zoomed and dual images), or due to operator selection. The small reference image for zoom will not use edge enhance. The basic approach for edge enhance is to high pass filter the data and sum it back in with the unfiltered data, with multipliers to allow variable weights (gain1, gain2) on the filtered and unfiltered data. The high pass leg of the filter can be a function of the amplitude of the delayed all pass leg. This is accomplished using a LUT.
- **Multi-transmit Splicer** - the splicer block is used to piece together sections of data from incoming vectors. During multi-transmit focal zone imaging it is used to extract the regions in vectors which surround the transmit focal depth. It extracts and combines groups of these higher focus regions into single output vectors. It smoothes the transitions regions between these segments so as to hide the edge effect which would otherwise be created by the combining of different vector data sets.

5-3-6 EBM, EBM2 Board

The EBM Board was used on forward production units starting with BT'02 (November 2002). The EBM2 Board was used on forward production units starting with R3.0.0 Software (BT'03 October 2003). The detailed functionality is found in the previous EQ and BMP sections.

5-3-6-1 Overview

The EBM/EBM2 board is the data path interface board between the last Time Delay board (TD) and the Scan Control Board (SCB). The EBM/EBM2 receives data from the Time Delay boards, processes the data for depth attenuation effects, and passes the data on to the BM processor, then to the Scan Control Board. This board is composed of two main sections the Equalization (EQ) and the B/M Mode Processor (BMP).

The EQ section compensates for the attenuation of ultrasound in tissue. The attenuation of ultrasound in tissue is usually modeled as being linearly dependent on frequency and depth. The EQ section provides two major data processing functions to compensate for this phenomenon, Time Gain Control (TGC), and Time Frequency Control (TFC). Using TGC and TFC, the EQ ”equalizes” image signals by removing depth dependent attenuation effects from the signal, hence the name ”equalization” board. In layman terms, the EQ gives a point deeper in the body an equal opportunity to contribute to the ultrasound image as one closer to the body's surface.

The BMP section process IQ Vectors from the EQ to create B and M mode vectors. This design is composed of 12 major blocks; Synthetic Aperture, Axial Interpolator, Detector/Vector Compounder, Smoothing Filter, Rate Converter, Dynamic Range Compression, Edge enhance, Splicer, B–Mode Output, M–Mode Output, Vector Configuration and the PCI Interface.

5-3-6-2 Modes of Operation

The EBM/EBM2 equalization design section supports two input data buses from the final summer of the TD board set. The two buses are referred to as the I and Q data buses (or pipes). Each two's complement bus is 24 bits wide and passes data from the final TD board to the EBM/EBM2 board. Different system modes of operation cause the two data pipes to handle data in different ways. The EBM/EBM2 board transfers output data to the Scan Control Board over two, two's complement sixteen bit I and Q buses. Internal EBM/EBM2 board data pipes are sixteen bit two's complement format.

5-3-6EBM, EBM2 Board (cont'd)

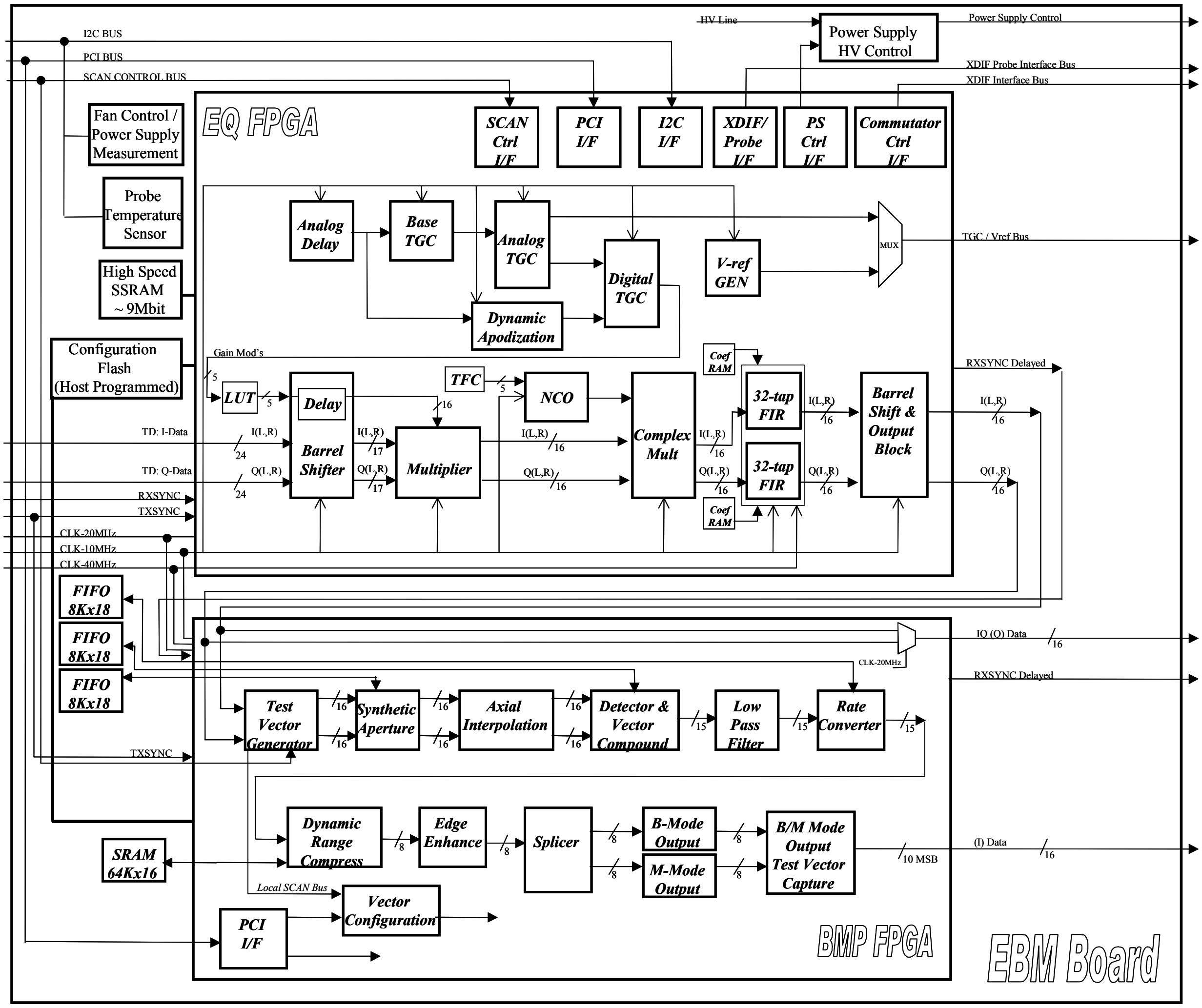


Figure 5-17 EBM/EBM2 Board Block Diagram

5-3-6-3 EBM/EBM2 Interface with XDIF relay board

The EBM/EBM2 EQ section supports an eight-bit read/write data interface to the XDIF relay board. The interface is used to transfer commutator control information to the selected probe and provides host access to the XDIF relay board itself. The EBM/EBM2 board monitors four probes present and four probe hook lines from the XDIF relay board. The EBM/EBM2 EQ section monitors the lines, and generates an interrupt signal when any of the signals change state. The interrupt signal will be debounced to limit the frequency with which probe interrupts may be generated. The EBM/EBM2 board also measures the temperature of the selected probe over two lines from the XDIF relay board. The SCE pulse signal connected to the EBM/EBM2 EQ section in order to be able to support the Global Beamforming future development.

5-3-6EBM, EBM2 Board (cont'd)

5-3-6-4 B–Mode Output Blocks

The B–mode output block collect vector data and tags for delivery to the Scan Control Board. It can form output vectors from one or multiple input vectors (multi–transmit focus). The vector tags are used to form the control bytes in the output vector. Only complete vectors are sent to the BM_OUTPUT Block. The maximum vector length shall be 512 pixels.

5-3-6-5 M–Mode Output Block

M–mode acquisition is nearly always a multiple firings per output vector operation. When the vector rate is higher than the display rate a peak accumulate function shall be used to provide an output which is the point–by–point peak signal amplitude of all the firings since the last output. The M–mode output block usually outputs one processed M vector after combining the receive vectors from several firings. The maximum ratio of input vectors to output vectors is 256, although this number is transparent to the hardware. M_GATE tag shall control when the current peak accumulation stops, the vector is sent and a new vector is formed. The peak accumulation shall be reset after the data is sent to the BM_OUTPUT Block.

Section 5-4
Back End Processor (BEP)

The Back End Processor (BEP) receives the data from the Front End Electronics, stores it in memory, performs scan conversion to pixel domain, and drives the system RGB monitor.

Back End Processor software is also providing Color Flow, Doppler, and M-Mode Processing.

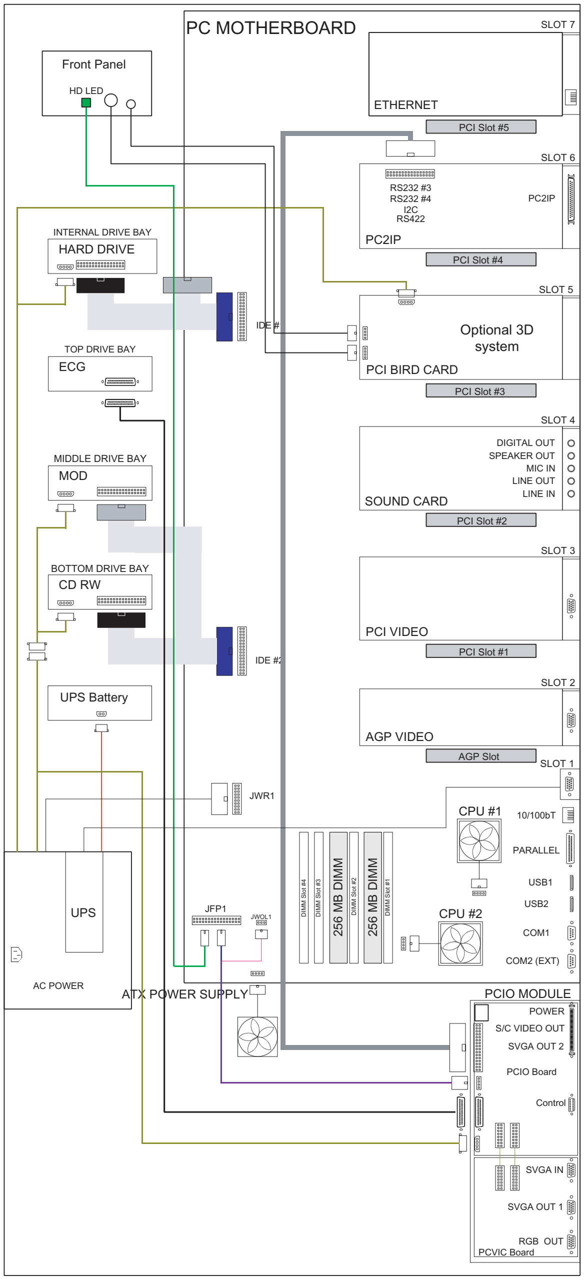


Figure 5-18 CPU/Back End Processor BEP1

NOTE: Specifications mentioned about the Back End Processor (BEP) will be minimum requirements. The actual hardware could exceed these specifications as technology advances.

5-4-1 Enclosure

The EMC enclosure shall house an ATX Power Supply with UPS battery backup, an ATX style motherboard with minimum of 512 MB of ram and two 733MHz processors

5-4-2 PCI Cards

5 PCI slots on the mother board shall contain the following:

1.) PCI Video Card - Digital Video to the Touch Panel
2.) Sound Card - Sound Blaster Live for audio to speakers
3.) Blank or PCI Bird 3D Card - Option
4.) PC2IP Card - GE designed. PCI Bus interface to the Front End Processor
5.) Network Interface Card - 3Com Ethernet Card

5-4-3 AGP Video Card - SVGA Video to the PCVIC Card

- Analog output shall comply with the SVGA specification.
- Resolution shall be 800x600.
- Support for 32 bit True Color
- Minimum of 8 Mbytes of high speed Video RAM, expandable to at least 16 Mbytes.
- 128-bit internal memory interface.
- Hardware supported asynchronous bit block transfer (80 Mpixels/sec).
- Full Direct 3D and Open-GI support (desirable).

5-4-4 PCIO Board:

This GE designed board does not plug into any slot but is mounted to the inside of the PC chassis.

- Power and Internal PCI control signals

5-4-5 PCVIC Card

- Input from AGP Video card (BEP1.0) or Motherboard AGP Video (BEP 2.0)

This GE designed board does not plug into any slot but is mounted to the inside of the PC chassis.

- SVGA output to the image monitor
- RGB output to color printer

5-4-6 DGVIC, DGIO and ADD Cards BEP 2.1 (BT'02, November 2002)

The ADD Card is a PCI card that mimics the AGP video and provides a digital video output to the DGVIC board.

The DGVIC converts the digital video to RGBS, SVGA (to Monitor and External I/O), S-video and Composite video outputs.

The DGIO provides signals and power to I/O boards. Signals like PS_ON, I^2C, RS232, PC Power and PC On/Off.

5-4-7 Additional Memory (RAM)(BT’03, October 2003) - BEP2.2

Additional memory was added to the motherboard for R3.0.0 Software and BT’03. one of the 256 MByte SIMM modules was replaced with a 512 MByte module. This brings the total RAM memory to 768MBytes and designated the unit to be a BEP2.2.

5-4-8 DGVIC/DGIO Upgrade

It is possible that older P3 Back End Processor video chains could be upgraded to digital. This involves replacing the Analog AGP Video card with a Matrox video card that has analog and video outputs.

The PC2IO/PCVIC Tray assembly is also replaced with the DGIO/DGVIC Tray.

Digital video is supplied by the Matrox video card to the DGVIC for distribution to peripherals. Monitor video is taken directly from the Analog output of the Matrox video card instead of the DGVIC.

5-4-9 UPS Battery Operation

The UPS batteries provide power to the Back End Processor to enable a controlled shut down of the processor. The UPS batteries will drain slightly when the system is in the off condition. The off condition is defined as:

- Circuit Breaker in the OFF position
- System unplugged from the wall outlet

If the system is left in the OFF condition for an extended period of time (3 to 5 days or more), the system may not boot up or may beep when turned ON. Should this occur, the system needs to recharge the UPS batteries. This could take 15 minutes to as long as 24 hours, depending on the battery age, system input voltage and system temperature.

To eliminate draining the UPS batteries, the system should remain plugged into the wall outlet with the circuit breaker in the ON position.

The expected life of the battery is approximately three (3) years.

5-4-10 Internal Storage Devices:

- A 20 or 40 Gigabyte EIDE Hard Disk Drive (HDD) inside the Back End Processor cabinet.
- 3.5 inch Magneto-Optical Drive (MOD) (available from front of scanner).
- CD-RW Drive (available from front of scanner).

5-4-11 Location of the Back End Processor

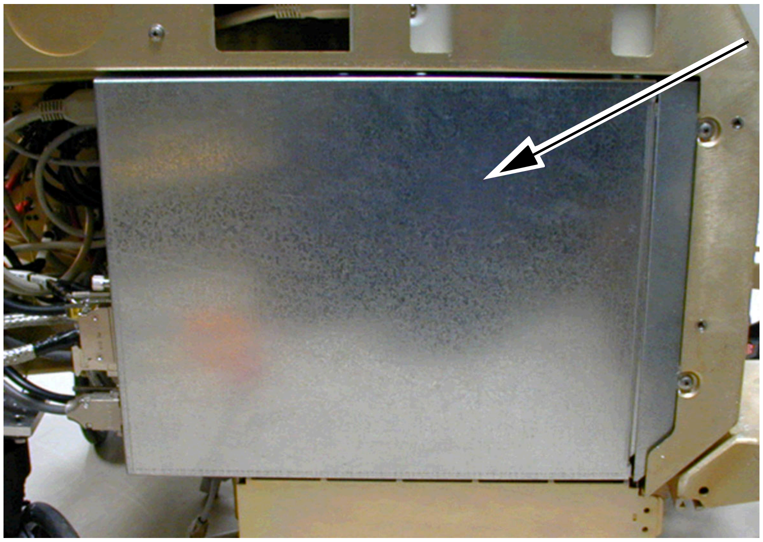

P3 Backend Processor
P4 Backend Processors typically have a fan in the center of the cover
Left Side of Scanner
Front of Scanner

Figure 5-19 Backend Processor mounted in scanner

5-4-12 Inputs

5-4-12-1 AC Power

Table 5-5 AC Power

Input	Description	Connection from:
230 VAC	AC Power	AC Distribution Box > Backend Processor

5-4-12-2 DC Voltages

Table 5-6 DC Input Voltages

Input	Description	Connected to:
+5Vstb	Standby voltage	DC Power Supply via Backplane
GND	Electrical Ground	DC Power Supply via Backplane and II/O

5-4-12Inputs (cont'd)

5-4-12-3 Input Signals

Table 5-7 Input Signals

Signal Name	Description	Signal Path
PWR_OK*	Power verification signal from Card Rack	Card Rack > IIO > PC2IO
ON/OFF Switch	Signal from the ON/OFF switch on the Control Panel and from the Reset button on the rear of the External I/O.	Top Console > IIO > PC2IO ON/OFF Reset (EIO) > IIO > PC2IO
I2C Register Interrupt	Interrupt signal from I2C Bus	EIO > IIO > PC2IO
Microphone in to BEP	Microphone signal from Monitor (Top Console)	Top Console > IIO > BEP
Audio in to BEP	Audio from VCR or Doppler Audio	Replay Audio from VCR > IIO > BEP Doppler Audio Out from Card Rack > IIO > BEP

5-4-12-4 Bi-directional Signals

Table 5-8 Bi-directional Signals

Signal Name	Description	Signal Path
UPS Control RS232	Control Signals to and from the UPS	BEP > IIO
RS232 XDCTRL	Not Used	PC2IO > IIO > Not Used
I2C Bus	Data bus used for Remote Control of External Units and for reading module versions.	PC2IO > IIO > EIO
Spare RS232	Not Used	PC2IO > IIO > Not Used
VCR Remote Ctrl (RS232)	Control signal to Internal VCR	PC2IO > IIO > VCR
USB #1	USB bus to Top Console	PC2IO > IIO > Top Console
COM 1	Can be configured to transfer report page data	PC2IO > IIO > EIO
COM 2	Modem	PC2IO > IIO > EIO (Rear of Module) > Modem
Ethernet	Standard TCP/IP Ethernet	BEP > IIO > EIO > External Network
USB #2	USB Bus for External Units	BEP > IIO > EIO > External USB Unit

NOTE: *BEP2.x processors have one Com Port and six USB Ports. The Com Port is connected to the modem via the Internal I/O. A USB to Serial Converter feeds the external serial connection via the Internal I/O. BEP 2.1 Processors have digital video coming from a Matrox or ADD card going to the DGIO/DGVIC Tray. BEP 2.x processors have Ethernet and Analog Video on the motherboard.*

5-4-12-5 USB to Serial Adapter Cable Setup (RS232 Serial Port Connector on the External I/O)

The Prolific USB to RS232 Adapter Cable (black one) should be properly set up when the Base Image Load is applied to the system. However, if you need to set a specific parameter for the USB COM Port (COM1) perform the following steps:

- After booting up with the Service Dongle, entering Maintenance Mode and Windows, select My Computer>Properties>Hardware Tab>Device manager.
- Under Ports (COM & LPT) select “Prolific USB-to-Serail Comm/Port (COM 3)” and select Properties.
- Under the Port Settings TAB you can set the Bits per second, Data bits, Parity Stop Bits and Flow Control to the desired values.

Table 5-9 Factory Default Values

Signal Name	Setting
Bits Per Second	9600
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None

5-4-13 Outputs

Table 5-10 Output Signals

Signal Name	Description	Signal Path
+5VDC	DC Voltage	PC2IO > IIO
+12VDC	DC Voltage	PC2IO > IIO
PS_ON*	TBD (Active Low)	PC2IO > IIO > Card Rack
Standby	TBD	PC2IO > IIO > Top Console
SVideo	SVideo Out	PCVIC > PC2IO > IIO > EIO
CVideo	Composite Color Video	PCVIC > PC2IO > IIO > EIO
VGA	VGA High Resolution Video to External Video Screen	PCVIC > PC2IO > IIO > EIO
VGA	VGA High Resolution Video to Internal Video Screen (Top Console)	BEP > Top Console
BW Video RGB	BW Video from RGB. This signal is not used on LOGIQ™ 9	PCVIC > PC2IO > IIO > EIO This signal is not used on LOGIQ™ 9
Audio Out	Audio Out from BEP	BEP > IIO > Internal VCR BEP > IIO > EIO > External VCR
TRIG	Video Trig Signal	PC2IO > IIO > EIO

5-4-14 BEP Power On Path

(refer to Figure 5-20 on page 5-29)

The Back End Processor is powered ON by:

- Press and release the OP I/O Standby (On/Off) switch.
- The signal from the OP I/O goes to the II/O (A4) and through the rack power relay in the Internal I/O.
- The PC Power ON signal from the II/O (B6) goes to the PC2IO (D2) then to the BEP motherboard commanding the BEP Power Supply to turn ON.

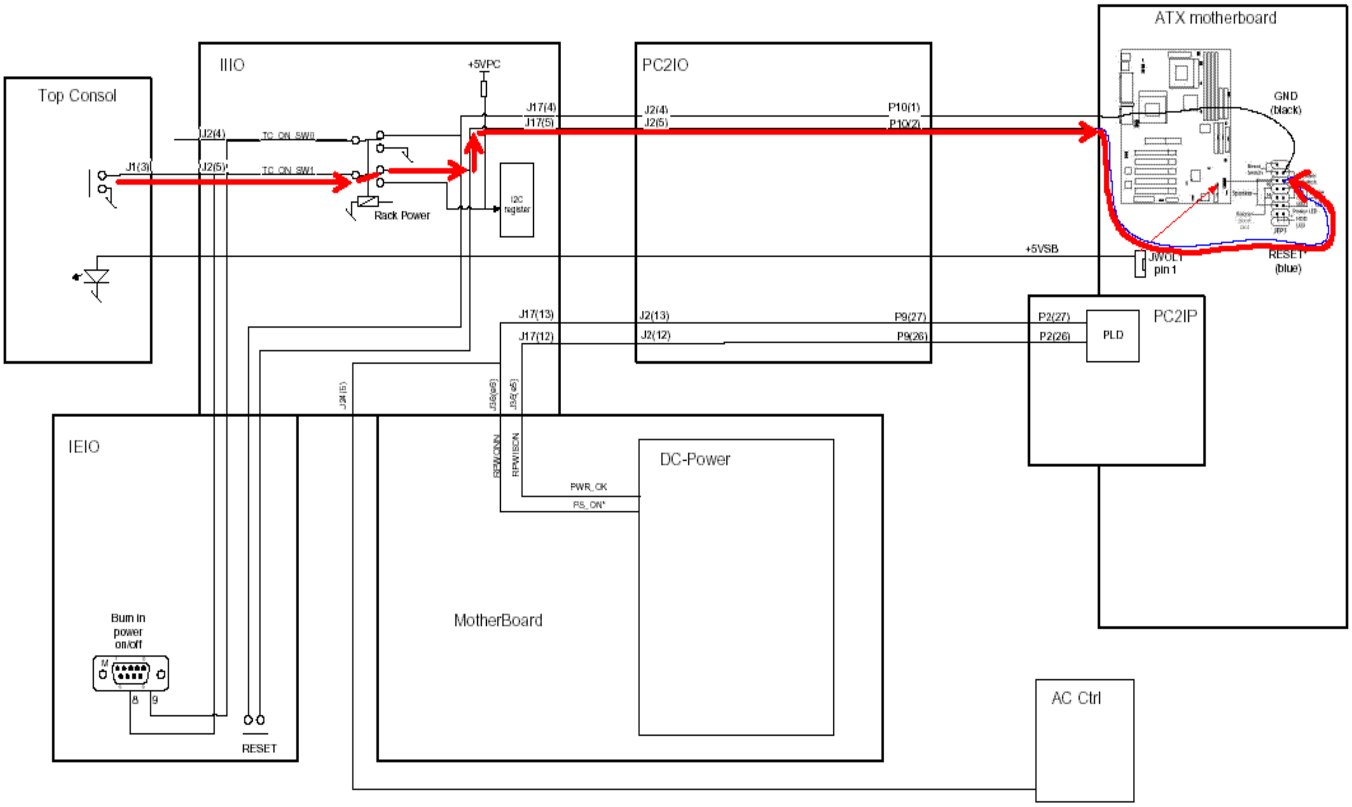


Figure 5-20 BEP Power On Path

5-4-15 BEP Power Off Path

(refer to Figure 5-21 on page 5-30)

The Back End Processor is powered Off by:

- Press and release the OP I/O Standby (On/Off) switch.
- The signal from the OP I/O goes to the II/O (A4) and through the rack power relay in the Internal I/O to the I^{2}C register.
- Software detects the request to power down via the I^{2}C buss from the II/O (B5) to the BEP (D1).
- The system begins a controlled shut down procedure closing applications, files, turning off FE rack power and finally BEP power.

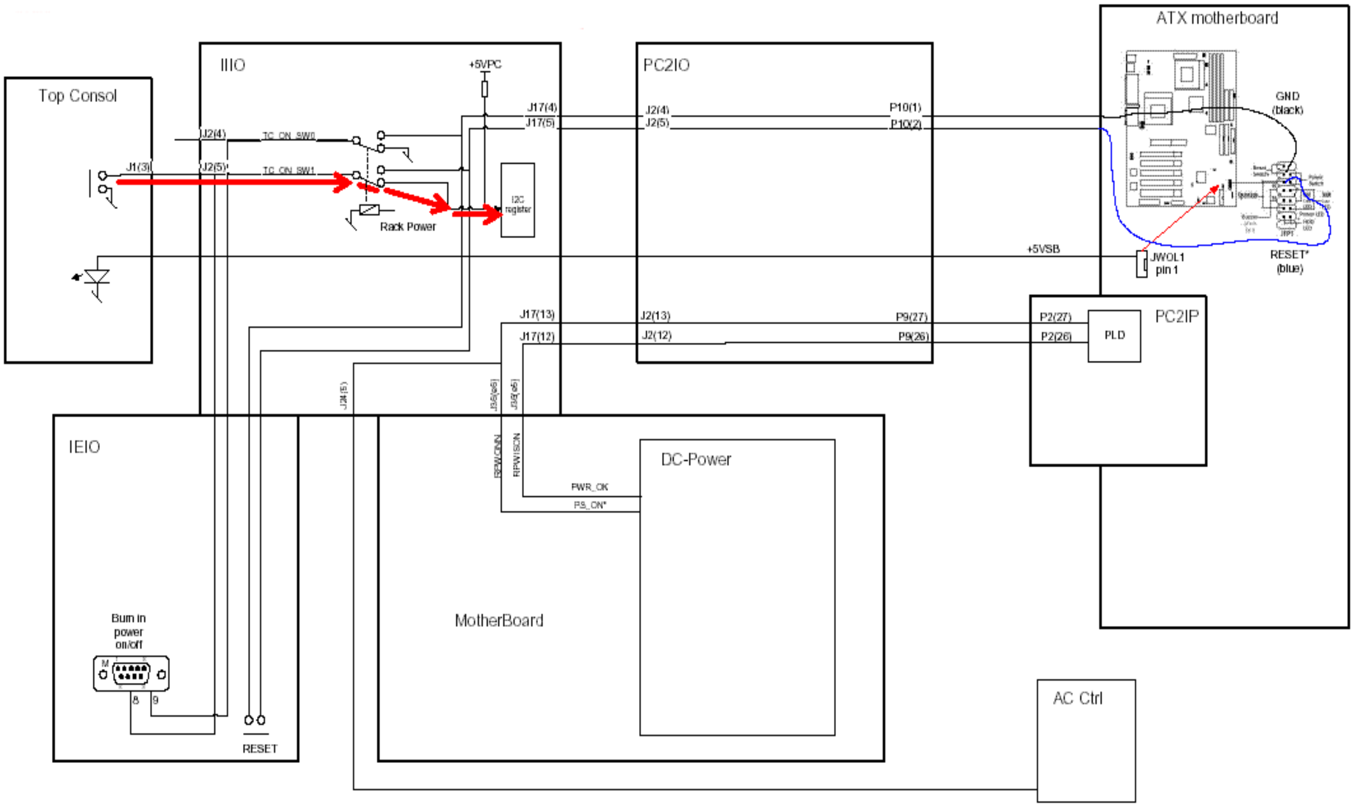


Figure 5-21 BEP Power Off Path

Section 5-5
Operator Console Control PWA

Figure 5-23 and Figure 5-22 show the audio path through the Operator Console Control Printed Wire Assembly.

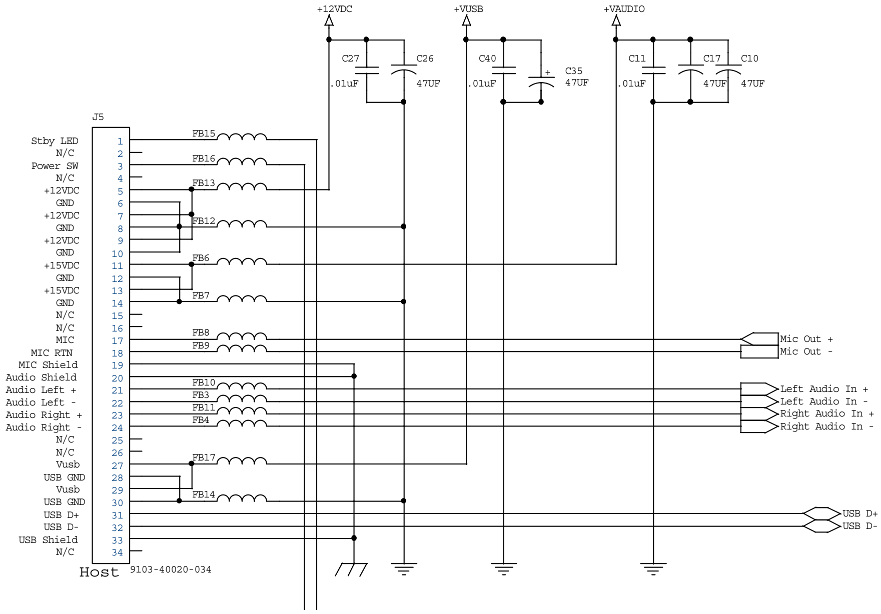


Figure 5-22 USB-OP Console Control PWA - Power

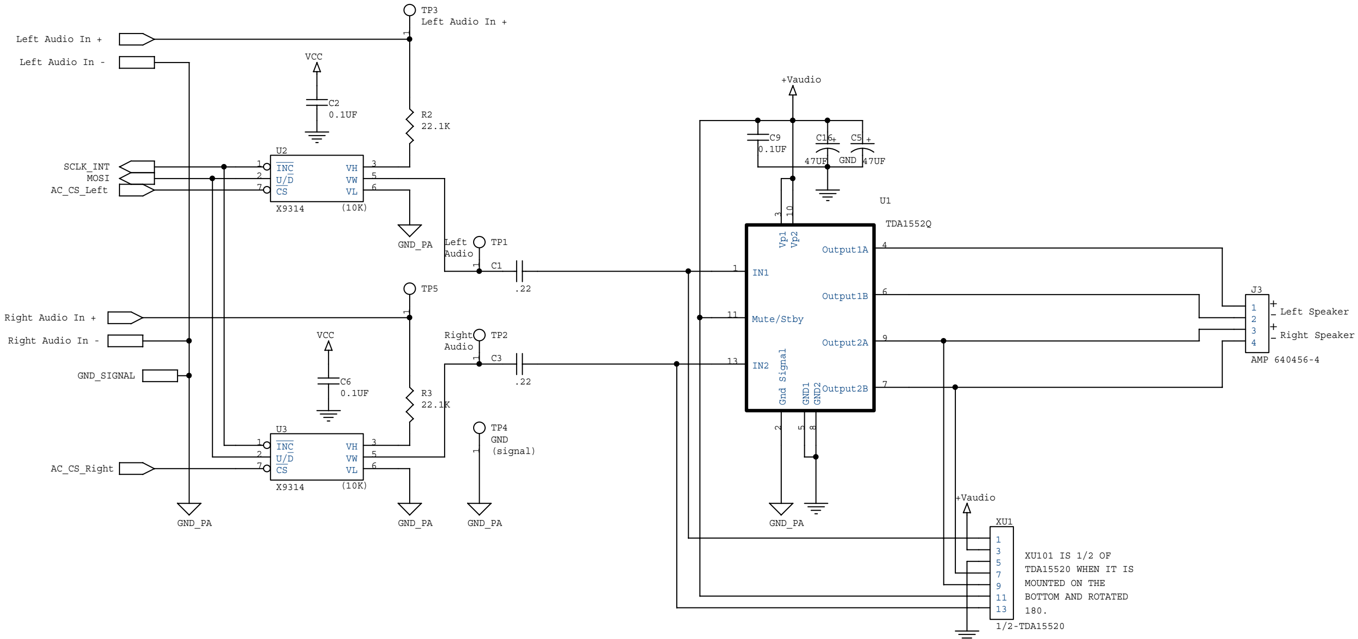


Figure 5-23 USB-OP Console Control PWA - Audio

5-5-1 Console Main Cable

5-5-1-1 Main Cable Connector Functions

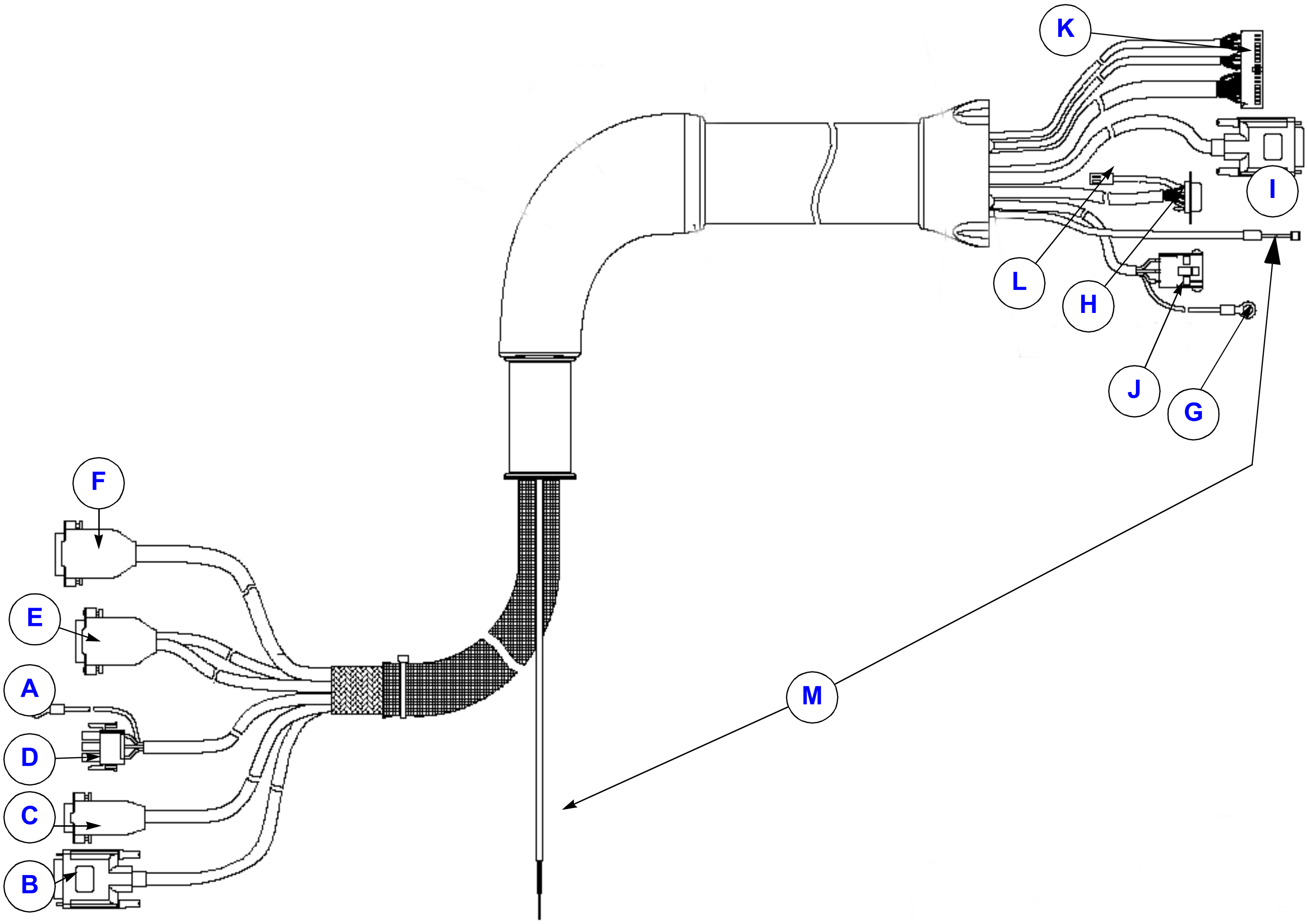


Figure 5-24 Main Cable Drawing

Table 5-11 Main Cable Composition

Item	Function	Lower to	Description		
A	Safety Ground Connector	A - G	Safety Ground Connector		
B	DVI to DVI Interface	B - I	Interface to the Touch Screen B- I		
C	RGB to the Main Monitor	C - H	RGB to the Main Monitor C - H		
D	110 VAC to the Main Monitor	D - J	110 VAC to the Main Monitor D - J		
E	USB Audio, Microphone	E - K	USB Audio, Microphone and DC for Operator Panel		
F	DC Power and Control	F - K	DC Power and Control to the Operator panel		
G	Safety Ground Connector	A - G	Safety Ground Connector		
H	RGB to the Main Monitor	C- H	RGB to the Main Monitor C - H		
I	DVI to DVI Interface	B - I	Interface to the Touch Screen B - I		
J	110 VAC to the Main Monitor	D - J	110 VAC to the Main Monitor D - J		
K	USB Audio, Microphone and DC	E/F - K	USB Audio, Microphone and DC for Operator Panel		
L	Microphone to the Operator panel	E - L	to the Operator panel Microphone		
M	“Z” Release Cable		From piston to “Z” relaease handle on the console		

5-5-1-2 Main Cable Connectors with Pinouts

Table 5-12 Connector A & G- Safety Ground

Pin	Signal
1	Ground

Table 5-13 Connector B & I - Touch Screen Interface

Pin	Signal	Pin	Signal	Pin	Signal
1	LVDS Data 2-	10	LVDS Data 1+	19	Ground
2	LVDS Data 2+	11	Ground	20	
3	Ground	12		21	
4		13		22	Ground
5		14	+5V	23	LVDS Clock -
6	+5V	15	Return	24	LVDS Clock +
7	Return	16	+12V Backlight		
8		17	LVDS Data 2-		
9	LVDS Data 1-	18	LVDS Data 2-		

Table 5-14 Connector C & H - Touch Screen Interface

Pin	Signal	Pin	Signal	Pin	Signal
1	Red	6	Red Ground	11	nc
2	Green	7	Green Ground	12	nc
3	Blue	8	Blue Ground	13	H Sync
4	nc	9	nc	14	V Sync
5	nc	10	Sync Ground	15	nc

Table 5-15 Connector D & J - 110VAC to Monitor

Pin	Signal	Pin	Signal	Pin	Signal
1	110 VAC	2	Ground	3	Neutral

Table 5-16 Connector E - USB, Audio & Microphone

Pin	Signal	Pin	Signal	Pin	Signal
1	nc	6	USB 5V	11	Ground Audio - Right
2	nc	7	USB 5V	12	Ground Microphone
3	Audio - Left	8	USB D+	13	Ground USB
4	Audio - Right	9	nc	14	Ground USB
5	Microphone	10	Ground Audio - Left	15	USB D-

Table 5-17 Connector F - Op Console Power

Pin	Signal	Pin	Signal	Pin	Signal
1	+15	6	+12V	11	Standby LED 0
2	+15	7	+12V	12	nc
3	nc	8	+12v	13	+12 Ground
4	On/Off SW0	9	+15 Ground	14	Ground USB
5	On/Off SW1	10	+15 Ground	15	USB D-

Table 5-18 Connector K- Op Console Power, Audio, Mic, Control

Pin	Signal	Pin	Signal	Pin	Signal
1	Standby LED 0	13	+15V	25	nc
2	nc	14	+ 15V Ground	26	nc
3	On/Off SW1	15	nc	27	USB 5V
4	On/Off SW0	16	nc	28	USB Ground
5	+12V	17	MIcrophone	29	USB 5V
6	+12V Ground	18	Microphone Ground	30	USB Ground
7	+12V	19	Shield Power/Control	31	USB D+
8	+12V Ground	20	Shield Audio/Mic	32	USB D-
9	+12V	21	Audio - Left	33	Shield USB
10	+12V Ground	22	Audio - Left Ground	34	nc
11	+15V	23	Audio - Right		
12	+ 15V Ground	24	Audio - Right Ground		

Table 5-19 Connector L- Console Microphone

Pin	Signal
1	Microphone
	Microphone Ground

Section 5-6
Patient I/O (Currently not supported by the LOGIQ™ 9)

The Patient I/O is mounted inside the Backend Processor's cabinet with its connector panel available on the front of the scanner.

The Patient IO contains the electronics for ECG, phono and two analog inputs. One of the inputs has programmable gain. The module extracts respiration from ECG. The electronics also contains a pacemaker detector. The four inputs are separately isolated because of safety requirements.

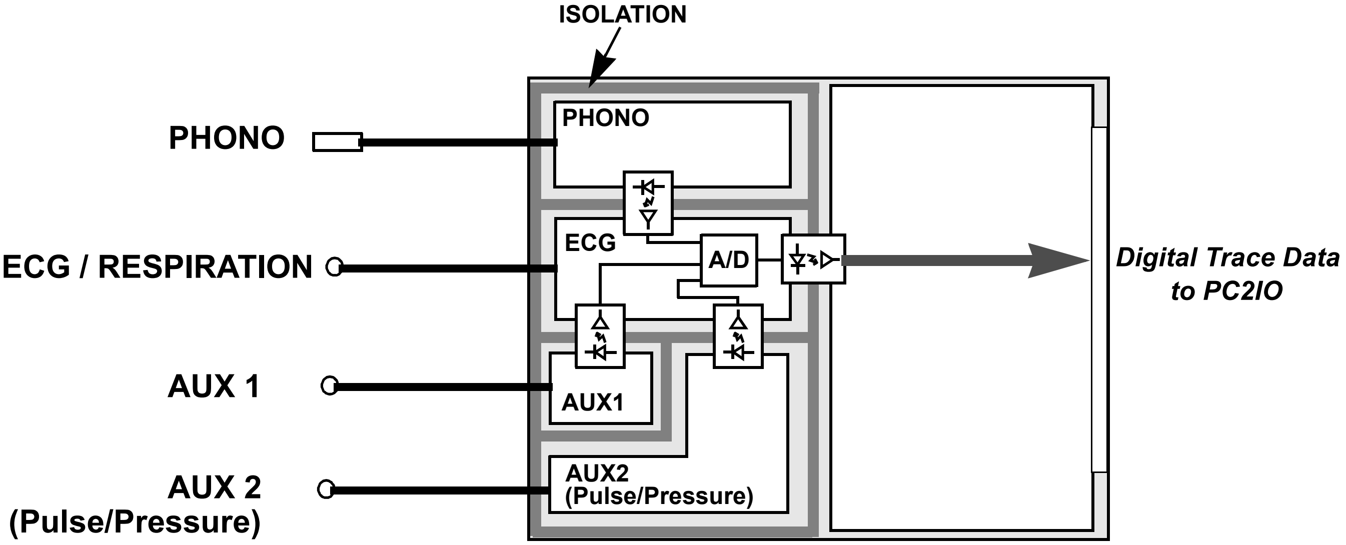


Figure 5-25 Patient I/O - Block Diagram

Inputs

- Phono (from a phono heart microphone)
- ECG / Respiration
- AUX1
- AUX2 (Pulse/Pressure)

These signals are optically isolated from the rest of the system.

Outputs

Serial Trace Data via Internal I/O to the SPD Board.

Section 5-7
Internal I/O

The **Internal I/O** is the interface between the Card Cage, PC Module, and the rest of the system, including the Top Console and the Peripherals. Table 9-16 on page 26 and Table 9-18 on page 33 have information on cable call-outs.

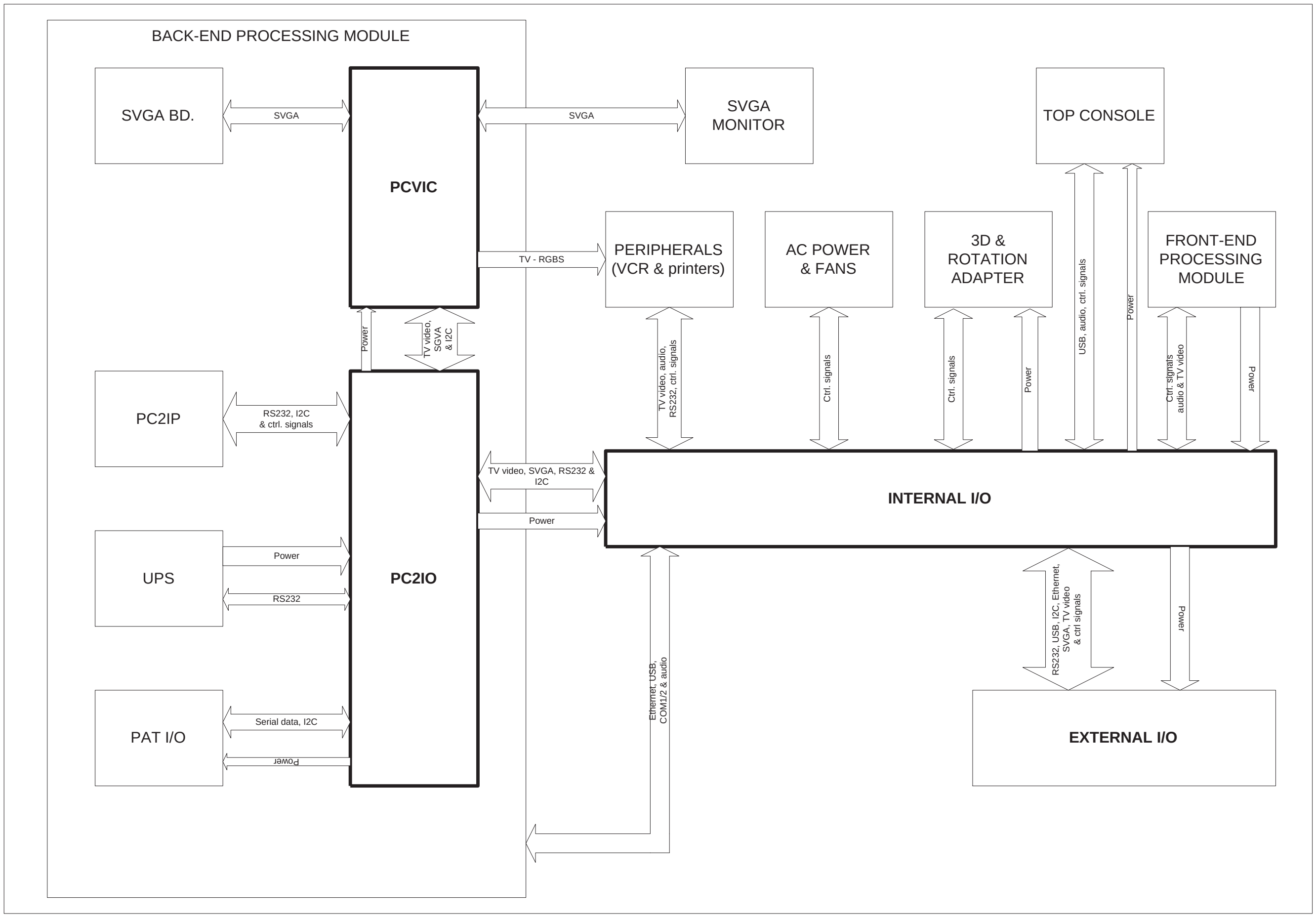

BACK-END PROCESSING MODULE
SVGA BD.
SVGA
PCVIC
SVGA
SVGA MONITOR
TOP CONSOLE
TV - RGBS
PERIPHERALS (VCR & printers)
AC POWER & FANS
3D & ROTATION ADAPTER
USB, audio, ctrl. signals
Power
FRONT-END PROCESSING MODULE
Power
TV video, SGVA & I2C
PC2IP
RS232, I2C & ctrl. signals
TV video, audio, RS232, ctrl. signals
Ctrl. signals
Ctrl. signals
Power
Ctrl. signals audio & TV video
Power
TV video, SVGA, RS232 & I2C
Power
INTERNAL I/O
UPS
Power
RS232
PC2IO
RS232, USB, I2C, Ethernet, SVGA, TV video & ctrl signals
Power
Ethernet, USB, COM1/2 & audio
PAT I/O
Serial data, I2C
Power
EXTERNAL I/O

Figure 5-26 Internal I/O Basic Interconnect

Section 5-7 Internal I/O (cont'd)

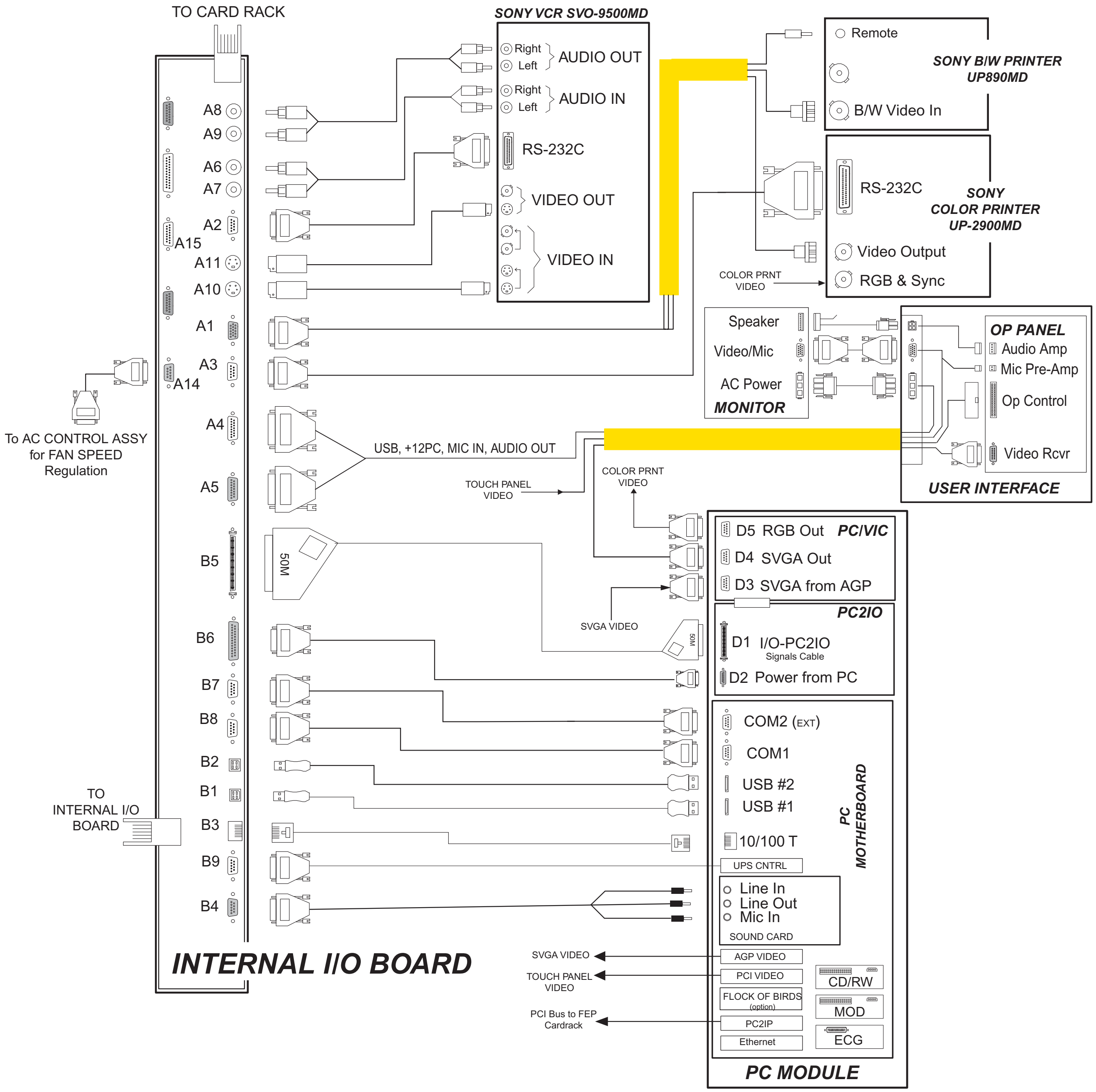


Figure 5-27 Internal I/O Module Overview

Internal I/O Enchnacement for BT'03 (FC200423)

Modifications were made to the Internal I/O in October of 2003 to enhance the performance of the Microphone function. Resistor values were changed in the microphone amplifier circuit to increase the gain, a capacitor was added to reduce noise as well as a mofidified wiring scheme and differential pre-amp to reduce noise. This new FRU is backwards compatible.

Section 5-7 Internal I/O (cont'd)

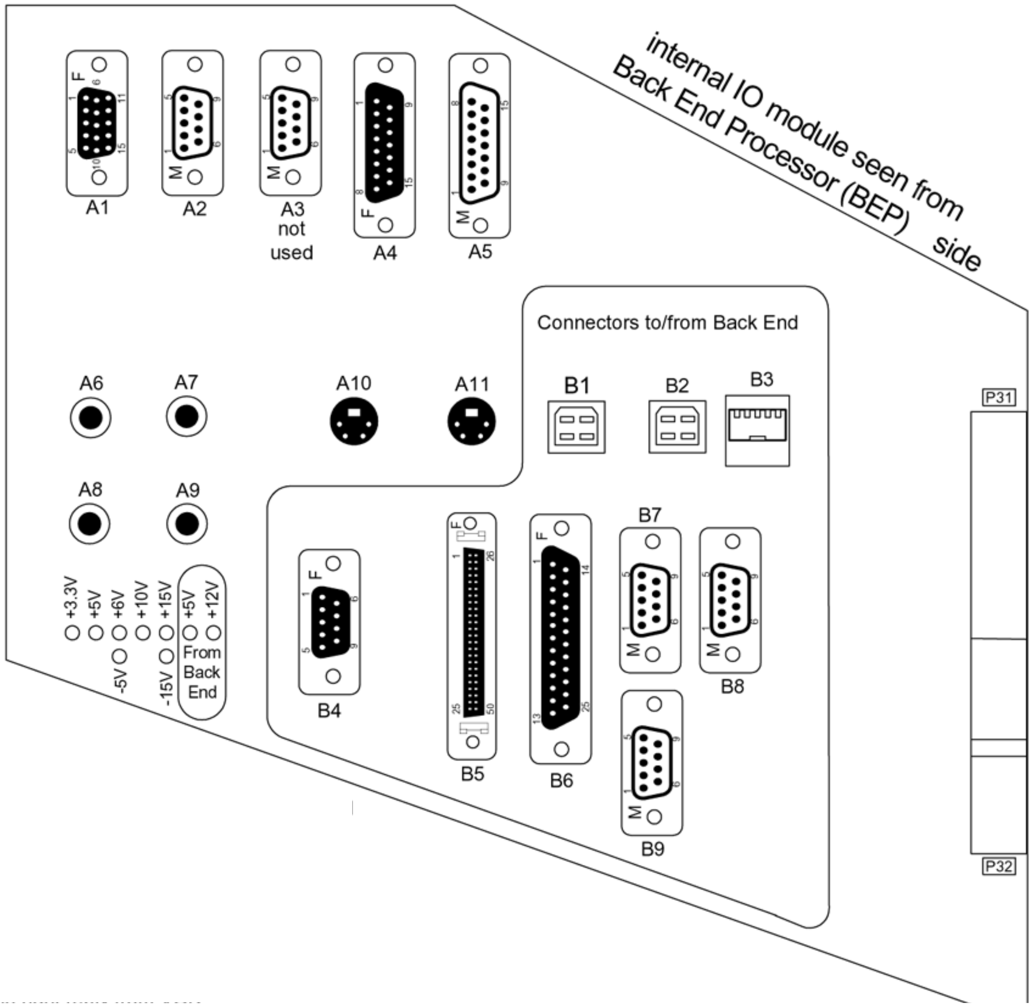


Figure 5-28 Internal I/O Back End Processor Connections

The Internal I/O board performs buffering and distribution of video and control data from various sources to multiple destinations.

- SVGA (R, G, B and Sync.) are fed from the BEP, directly up to the system monitor. Another set of RGB can be fed to a color printer.
- Composite video, black and white video and S-Video are buffered and distributed to VCR and printers.
- The analog Doppler signals are fed from the Spectrum Doppler board to the VCR audio inputs and through a switch where audio from VCR playback also is input, to the BEP and then to the speakers.
- Serial RS-232 interface signals from the BEP are fed to the destinations; VCR, Color Printer and Modem.
- Serial USB interface signals from the BEP are fed to the Front Panel and to EIO.
- Remote control signals for printers are generated on the I/O board.
- The Footswitch is connected to the I/O board.
- An AC Power Interface controls power on/off and fan speed.

5-7-1 Location in the Unit

The Internal I/O Module is plugged into the Card Rack (at the end nearest to the rear of the system).

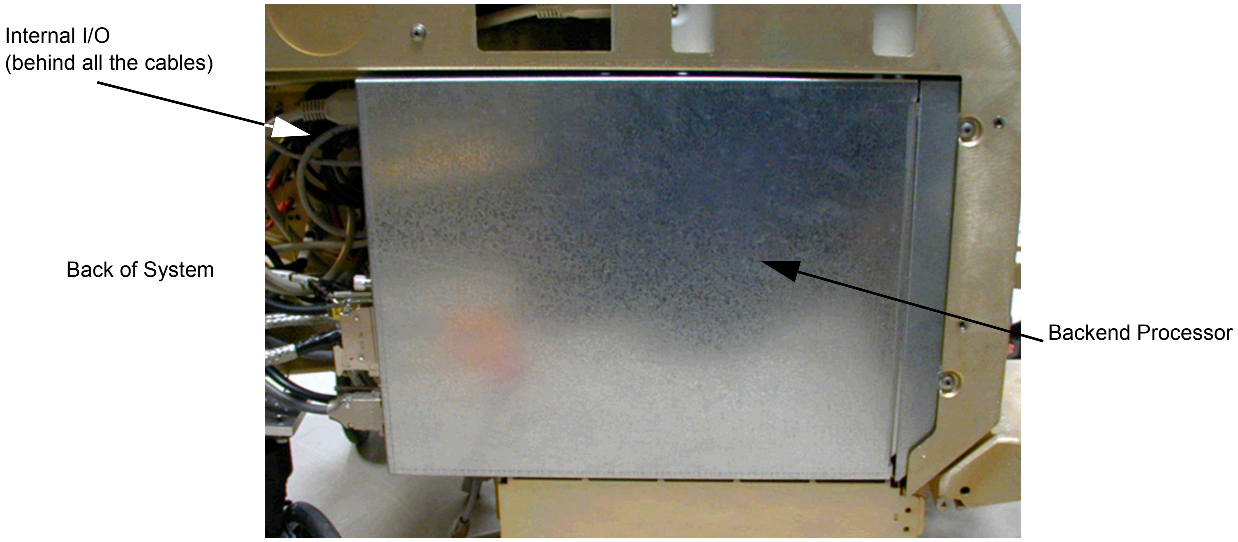


Figure 5-29 Internal I/O: Location in the System (Seen from Left Side)

5-7-2 LEDs

Nine green LEDs indicate that the respective DC Voltages are OK.

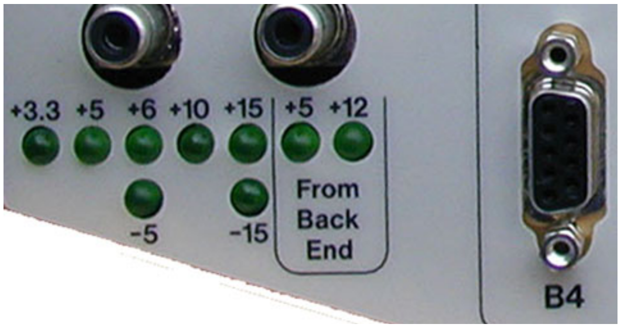


Figure 5-30 Internal I/O: Green LEDs for Power Status.

5-7-3 Fuses

All output voltages are fused

5-7-4 Jumpers and Dip-switches

TBD

5-7-5 Inputs

DC Voltages

Table 5-20 DC Input Voltages

Input	Description	Connection from
+3.3 VDC	Input DC Voltage	DC Power Supply > Backplane > J32
+5 VDC	Input DC Voltage	DC Power Supply > Backplane > J32
+10 VDC	Input DC Voltage	DC Power Supply > Backplane > J32
+15 VDC	Input DC Voltage	DC Power Supply > Backplane > J32
-15 VDC	Input DC Voltage	DC Power Supply > Backplane > J32
+6 VDC (analog)	Input DC Voltage	DC Power Supply > Backplane > J32
–5 VDC (analog)	Input DC Voltage	DC Power Supply > Backplane > J32
+5 VDC	Input DC Voltage	Backend Processor > J17
+12 VDC	Input DC Voltage	Backend Processor > J17)

Video Input Signals

Table 5-21 Video Input Signals

Input	Description	Connection from
SVGA	Video Signal to External I/O	PC2IO (Connector J16)
SVHS	Video Signal to VCR & External I/O	PC2IO(Connector J16)
SVHS	Video Signal to MBD (IMP)	VCR (Connector J11)
Luma	Video Signal to B&W Printer and External I/O	PC2IO (Connector J16)
Comp. Video	Video Signal to External I/O	PC2IO (Connector J16)
Comp. Video	Video Signal to MBD (IMP)	Color printer

Audio Input Signals

Table 5-22 Audio Input Signals

Input	Description	Connection from
Two channel audio	Audio signals, summed and distributed	MBD (IMP)
Two channel audio		VCR
Two channel audio		BEP

5-7-5Inputs (cont'd)

Serial Ports

Table 5-23 Serial Ports

Input	Description	Connection from
USB	Standard USB Serial Bus	BEPM - Top console
USB	Standard USB Serial Bus	BEPM - IEIO
Ethernet	Standard Ethernet	BEPM - IEIO
RS232	Standard RS232 Serial Bus	BEPM COM1 - IEIO
RS232	Standard RS232 Serial Bus	BEPM COM2 - IEIO
RS232	Standard RS232 Serial Bus	PC2IO - Spare (J16)
RS232	Standard RS232 Serial Bus	PC2IO - VCR (J16)
RS232		PC2IO - Color printer (Connector J16)
RS232		PC2IO – UPS (Connector J16)

Control Signals

Table 5-24 Control Signals

Input	Description	Connection from
Control signals	Spare	MBD/FEC (Connector J16)
Control signals	Spare	MBD/FEC (Connector J16)
Trace trigger	To EIO	PC2IO (Connector J16)
Fan control signals	To AC Power	MBD (Connector J16)
Power control signals	To MBD and AC Power	PC2IO (Connector J16)
Power on/off	To Relay	Top Console ON/OFF Switch and EIO Test (Connector J16)
Standby	To Top Console	PC2IO (Connector J16)

5-7-6 Outputs

DC Voltage

Table 5-25 DC Output Voltages

Output	Description	Connection to
+5 VDC +12 VDC	From BEP	Spare (Connector J21)
+5 VDC, -15 VDC, -5 $\text{VDC}_{\text{analog}}$	From Card Rack	
+5 VDC +12 VDC	From BEP	Not Used
+5 VDC, -15 VDC, -5 $\text{VDC}_{\text{analog}}$	From Card Rack	
+5 VDC, +15 VDC,	From Card Rack	Not Used
+12 VDC	From BEP	Top Console
+15 VDC	From Card Rack	
+5 VDC +12 VDC	From BEP	EIO
+5 VDC, +15 VDC, -5 $\text{VDC}_{\text{analog}}$ +6 $\text{VDC}_{\text{analog}}$	From Card Rack	

AUDIO

Table 5-26 Audio Outputs

Output	Description	Connection to
Audio (two channels)	Audio (Doppler sound) from MBD (IMP), VCR, BEP	Top Console speakers and BEP
		VCR and IEIO

5-7-6Outputs (cont'd)

Interface Connectors – Component Side

Table 5-27 Connectors, Component Side

Input	Description	Connection from
A1/J1	B&W printer, 15pins HD-sub, female.	
A2/P4	VCR remote ctrl – RS232: 9pins D-sub, male.	
A3/P5	Color printer - RS232: 9pins D-sub, male.	
A4/J2	Top Console - Power & signals: 15pins D-sub, female.	
A5/P4	Top Console - Signals: 15pins D-sub, male.	
A6/J6	Audio out to VCR, left: Phono jack.	
A7/J7	Audio out to VCR, right: Phono jack.	
A8/J8	Audio in from VCR, left: Phono jack.	
A9/J9	Audio in from VCR, right	
A10/J10	SVHS out to VCR	
A11/J11	SVHS in from VCR	
B1/J12	USB to Top console	
B2/J13	USB to external I/O	
B3/J14	Ethernet	
B4/J15	Audio I/O	
B5/J16	PC2IO signals	
B6/J17	PC2IO power	
B7/P18	COM1	
B8/P19	COM2	
B9/P25	UPS remote control	
J32	MBD – signals and power	

Table 5-28 Connectors, Solder side

Input	Description	Connection from
A12/J21	Spare power, 15pins D-sub, female	
A13/J20	Spare – power, 15pins D-sub, female	
A14/J24	AC power ctrl, 9pins D-sub, female	
A15/P23	Rotation adapter – signals, 15pins D-sub, male	
A16/P22	Spare – signals, 25pins D-sub, female	
P30	EIO – signals and power, 110pins male	

Section 5-8
Top Console

The **Top Console** includes a Stand By/On switch, a keyboard, different controls for manipulating the picture quality, and controls for use in Measure & Analyze (M&A).

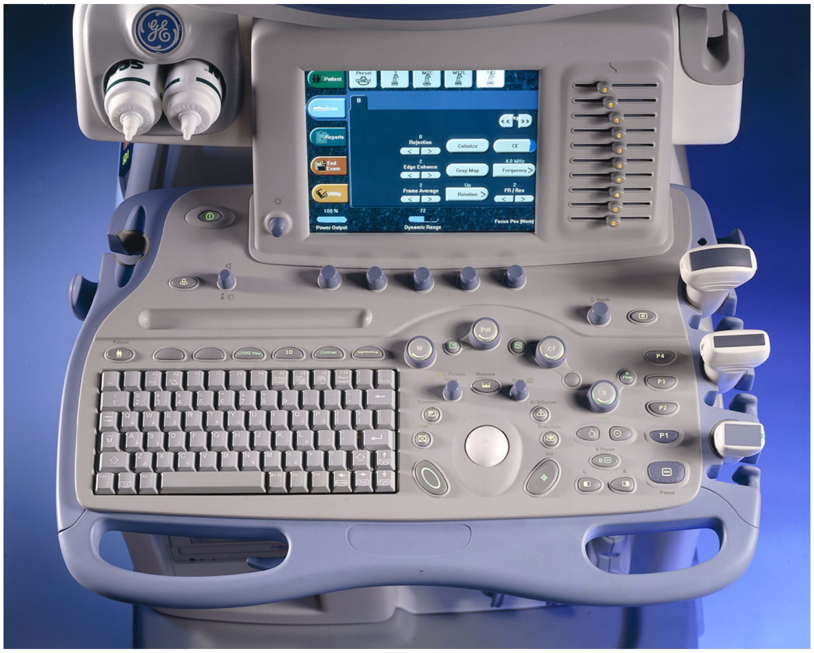


Figure 5-31 Top Console

BT’03 Consoles added a USB connector to the Upper Op Panel for the Wired Voice Scan Option.

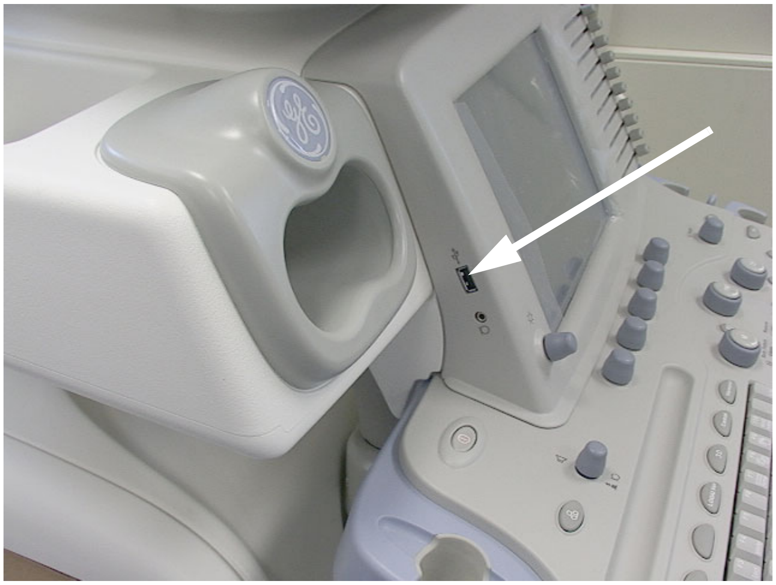


Figure 5-32 BT’03 Top Console

Section 5-9
Monitor

17-inch High Resolution Monitor with no interlace scan includes loudspeakers for stereo sound output (used during Doppler scanning).

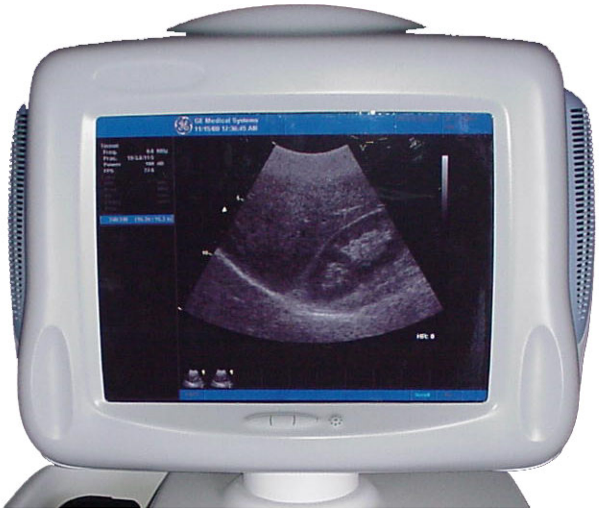


Figure 5-33 Monitor

Section 5-10
External I/O

The External I/O is the interface between the scanner and all external items.

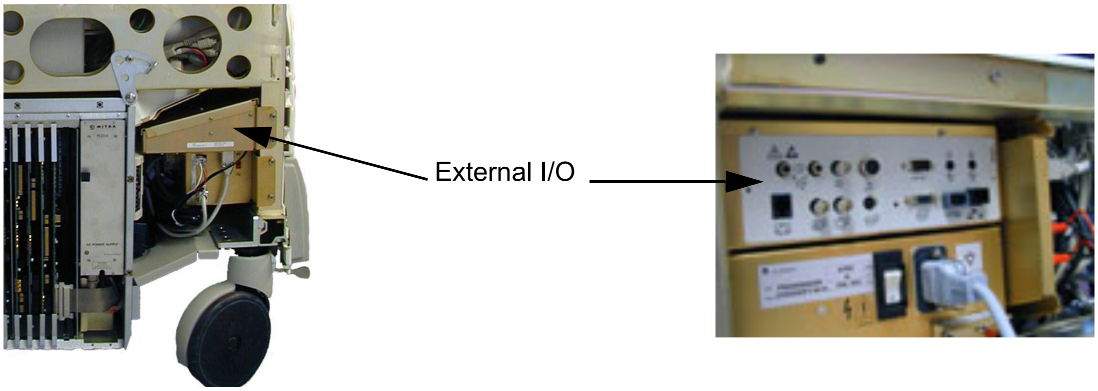


Figure 5-34

5-10-1 Location in the Unit

On the rear of the scanner, above the power inlet and power breaker.

5-10-2 Input Signals

Table 5-29 Input Signals

Input	Description	Connection from/via/to
Footswitch Connector	Footswitch is a mechanical switch that connect a signal to ground. Internal level is TTL (0-3.3V)	Footswitch > External I/O > Internal I/O > PC2IO (BEP)
DC Voltages from BEP		
+5 VDC	Used for Optical Couplers on RS232 signals	PC2IO (BEP) > Internal I/O > External I/O
+12 VDC		
DC Voltages from Card Rack		
+5 VDC	Used for Optical Couplers on Footswitch	Card Rack > Internal I/O > External I/O
+15 VDC		
-5 VDC $_{analog}$		
+6 VDC $_{analog}$		

5-10-3 Bi-directional Signals

Table 5-30 Bi-directional Signals

Signal Name	Description	Signal Path
Ethernet	Standard 10/100 Base TX Ethernet	Ethernet - External I/O - Internal I/O - BEP (Ethernet Connector)
COM1	Serial RS-232 port (Can be configured to transfer report page data to an external processor)	External Device - External I/O - Internal I/O - BEP (COM1)
USB	Standard USB (Universal Serial Bus), (0-5V)	USB Device - External I/O - Internal I/O - BEP (USB #2))
Modem	Internal Modem Telephone Line Connection	Analog Phone Line - External I/O (Connector Panel) - External I/O (Rear Side)- Modem
COM2	Serial RS-232 port (on rear side of External I/O)	Modem - External I/O (Rear Side) - Internal I/O - BEP (COM1)
Burn-in Power On/Off Control	Burn-in Power On/Off Control (on rear side of External I/O) - Used for factory testing.	External I/O (Rear Side) - Internal I/O

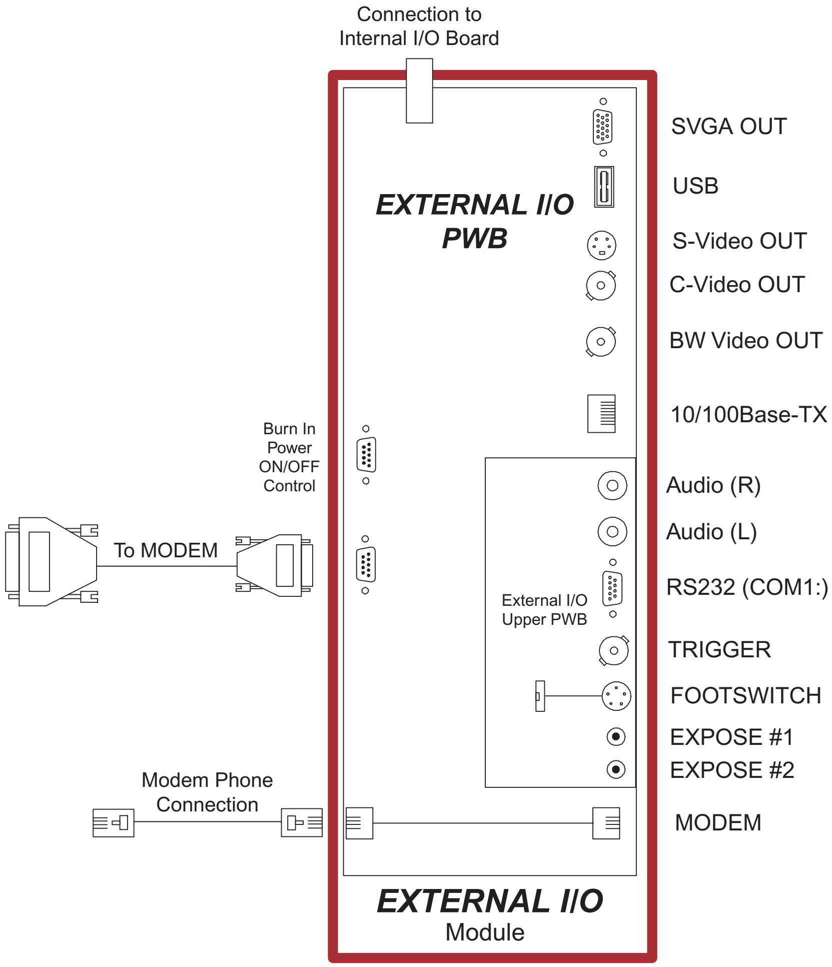


Figure 5-35 External I/O

5-10-4 Output Signals

Table 5-31 Output Signals

Signal Name	Description	Signal Path
Stereo Audio	Stereo audio to external VCR. (Same signal as delivered to internal VCR).	Audio Source (Internal VCR/ Microphone/BEP) > Internal I/O > External I/O > External VCR.
Composite Video	External composite video, 1.0Vp-p, 75 ohms, unbalanced, sync negative.	PC2IO (BEP) > Internal I/O > External I/O > External Composite Video Device
Super Video (SVHS)	Super Video Luminance: 1.0Vp-p, 75 ohms, unbalanced. Color: 1.0Vp-p, 75 ohms, unbalanced.	PC2IO (BEP) > Internal I/O > External I/O > External VCR
Black and White video	External black and white video 1.0Vp-p, 75 ohms, unbalanced, sync negative.	PC2IO (BEP) > Internal I/O > External I/O > External B/W Video Device
Trig	Trigger Signal, 0-3.3V	
SVGA	SVGA (RGBS) high resolution video output (Same signal as sent to the systems monitor)	PCVIC > PC2IO (BEP) > Internal I/O > External I/O > External Monitor
Remote Expose #1	A SW controllable relay, to control external peripherals	PC2IO (BEP) > Internal I/O > External I/O > External Peripheral
Remote Expose #2	A SW controllable relay, to control external peripherals	PC2IO (BEP) > Internal I/O > External I/O > External Peripheral

Several signal are fed from the Internal I/O board to an External I/O board located on the rear of the system. This board contains data buffers and a galvanic isolation section.

Different types of signals are fed to connectors accessible on the External I/O.

- R, G, B and Sync are provided for external RGB monitors or printers.
- Composite video, black and white video and S-VHS video are buffered and fed to output connectors for external monitors and printers.
- Two serial RS-232 ports are provided for external communication with e.g. the System CPU.
- An Ethernet signal from the BEP is fed to an Ethernet connector. It is used for connectivity, including DICOM Network.

Section 5-11
Peripherals

A VCR, an analog or digital Black-and-White Video Printer and an analog or digital Color Printer may be installed on the scanner. These devices receive video signals from the Internal I/O Board and power from the AC Control Box.

Peripherals are gemerally specified and approved regionally.

BT'02 (BEP 2.1 and above) systems have digital peripheral capabilities through USB or USB To SCSI converters.

Section 5-12
Modem

5-12-1 General Description

Multi-Tech global modem. The modem is a standard modem that connects to an analog phone line.

5-12-2 Location in the Unit

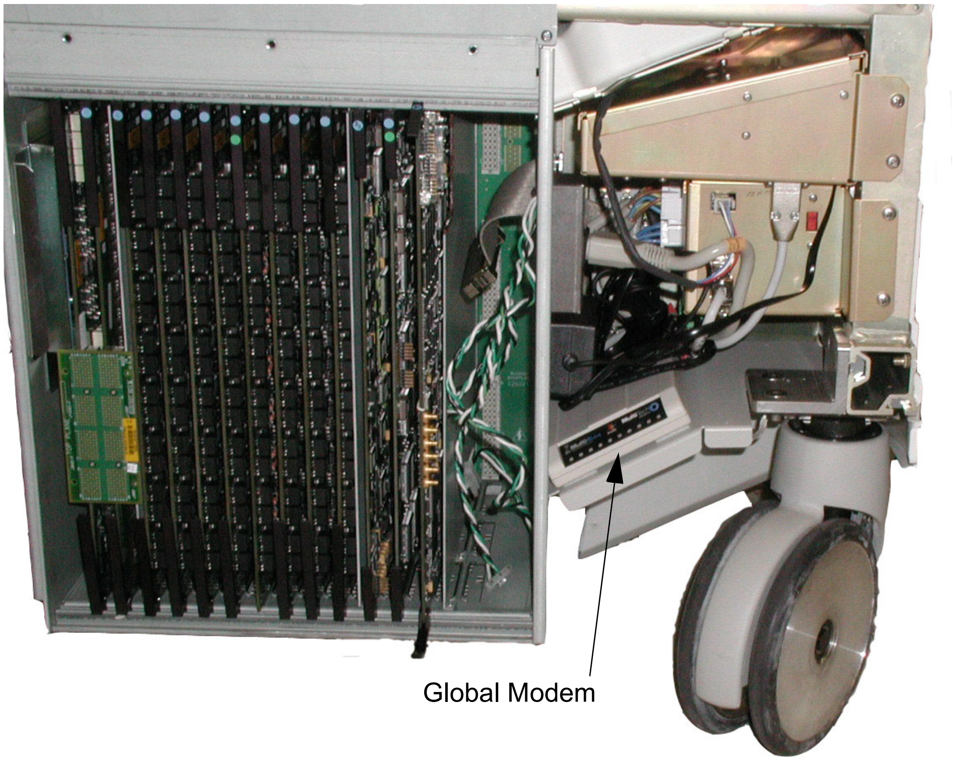


Figure 5-36 Modem: Location in Unit

5-12-3 Inputs/Outputs

- DC Voltage from Modem Power (AC/DC Converter)
- RS232 from Backend Processor via Internal I/O and External I/O
- Analog Phone line via External I/O

5-12-4 Fuses

None

5-12-5 Jumpers and Dip-switches

None

5-12-6 LEDs

The Modem has 10 LEDs on its front.

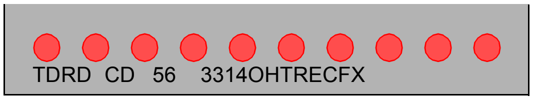


Figure 5-37 LEDs on Modem's Front Panel

Table 5-32 LEDs on Modem

LED Color	Description	Normally State
🟥 - Red	TD (Transmit Data)	Flashes during use.
🟥 - Red	RD (Receive Data)	Flashes during use.
🟥 - Red	CD (Carrier Detect)	ON when detecting a carrier from another modem and during communication. OFF indicates no or broken connection.
🟥 - Red	56 (56K Mode)	During Power On: Briefly Flashing These LEDs indicates communication speeds above 14 kbs. If one of this LEDs are ON during communication, it will stay ON until the modem is reset or connected the next time. At speeds below 14 kbs, these LEDs are OFF.
🟥 - Red	33 (V.34 Mode)	
🟥 - Red	14 (V.32bis Mode)	
🟥 - Red	OH (Off hook)	ON when dialing, online, or answering a call Flashes if puls dialing Off when modem not in use
🟥 - Red	TR (Terminal Ready)	ON when the system initializes the modem. It indicates that the modem is ready for an outgoing or incoming call. OFF indicates that communication on the RS232 (COM) port has been broken. The connected (remote) modem will disconnect.
🟥 - Red	EC (Error Correction (V.42))	ON: Error Correction (V42) is turned ON Blinking: Compression turned ON OFF: Normal operation.
🟥 - Red	FX (Fax)	Always OFF

Section 5-13
Power Distribution

5-13-1 Basic Overall AC Power Distribution

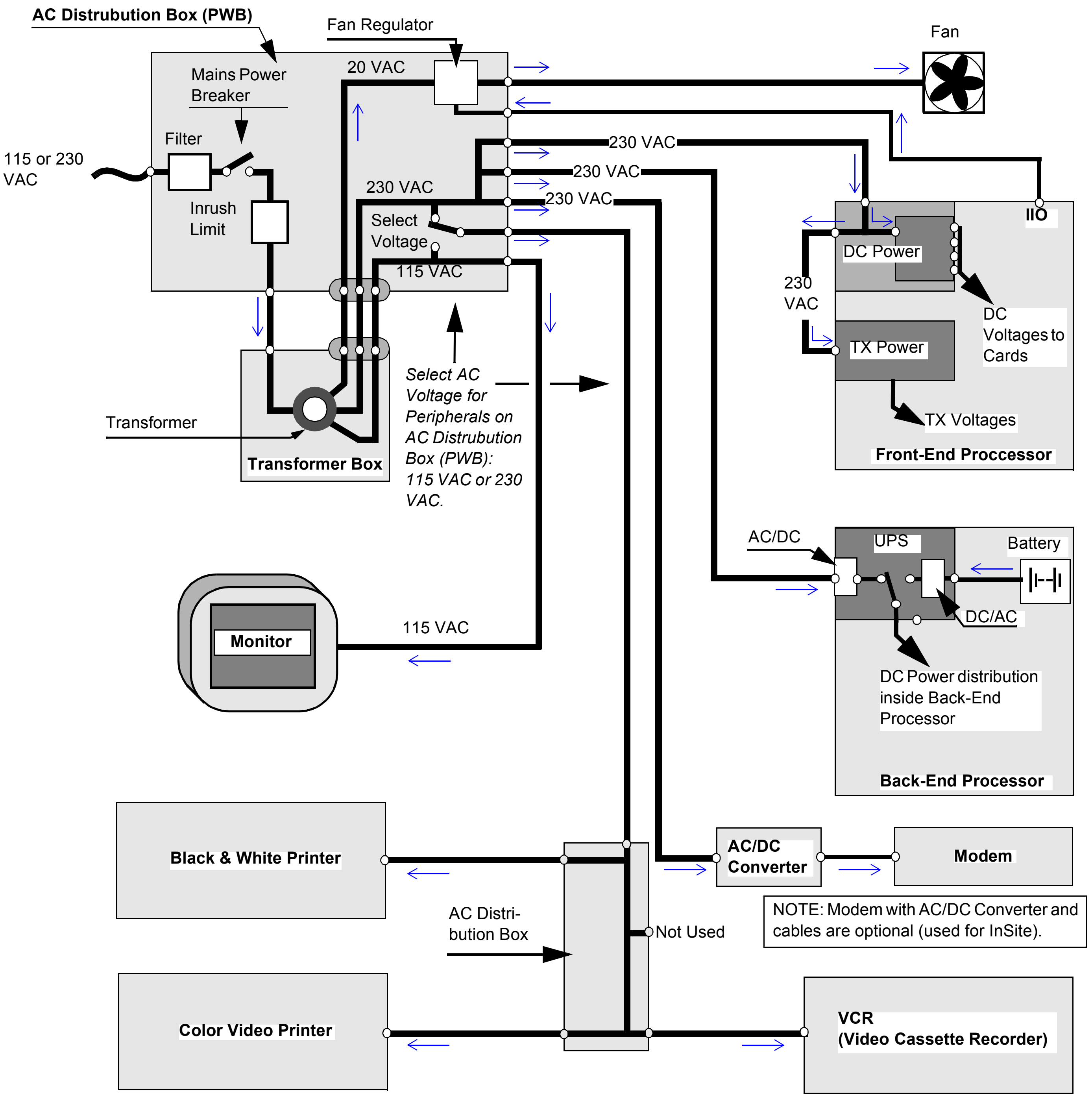


Figure 5-38 Overall Power Distribution

5-13-2 Overview

The AC Power's main tasks are to supply the various internal subsystems with AC power and to galvanically isolate the scanner from the on site Mains Power System. To reduce inrush current, an inrush current limiter as well as an EMI filter. Voltage to peripherals can be configured to either 115 VAC or 230 VAC. The AC Power also controls and supplies the 20VAC needed by the systems cooling fan.

5-13-3 AC Power PWB

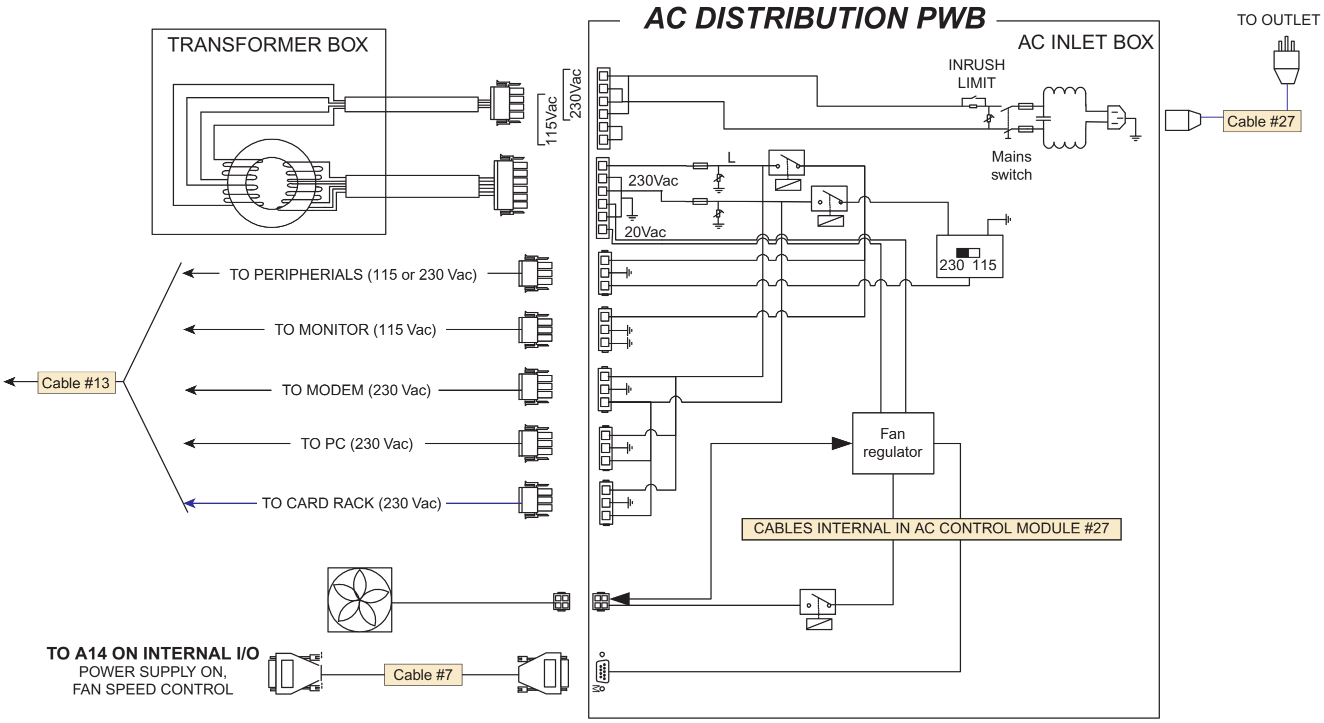


Figure 5-39 AC Power Distribution

The mains cord has plugs in both ends. A female plug connects to the scanner and a male plug to the mains outlet on site.

The mains voltage is routed via an EMI filter to the Mains Switch, located on the rear of the system.

The Mains Switch is of the auto fuse type, if for some reason the current grows to high, the switch will automatically break the power.

From the Mains Switch, the AC power is routed via an Inrush Current Limiter (titled: Inrush Limiter in Figure 5-39) to a internal outlet connector for the Mains Transformer.

5-13-3AC Power PWB (cont'd)

The Transformer is the galvanic barrier between the rest of the scanner and the on site AC Mains.

Input voltage to the transformer can be either 230VAC or 115 VAC (two different part numbers/FRUs). The configuration of the plug on the cable to the AC Transformer is different for the two AC Voltages.

From the AC Transformer, there are three outlets;

- 20 VAC
- 115 VAC
- 230 VAC

The 20 VAC is routed via the fan regulator to the system fan. (See separate description, *Chapter 5 - Air Flow Control*).

The 115 VAC is routed via a fuse to an AC Voltage selector, used for selecting the right output voltage for the Peripherals outlet and the Monitor. (The alternative voltage to this outlet is 230 VAC.)

The 230 VAC output from the Transformer is routed via a fuse and distributed to the AC Voltage selector for the Peripherals outlet and to the following AC outlets:

- Modem
- Back End Processor
- Card Rack

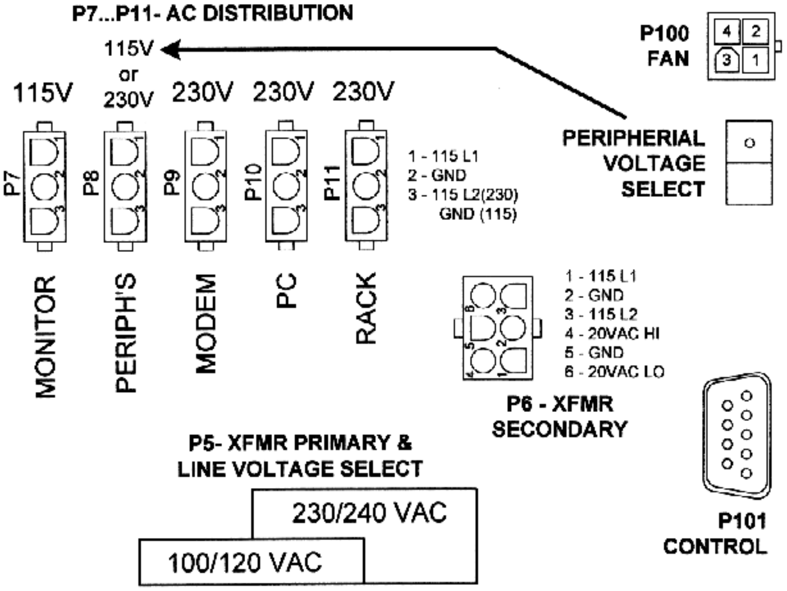
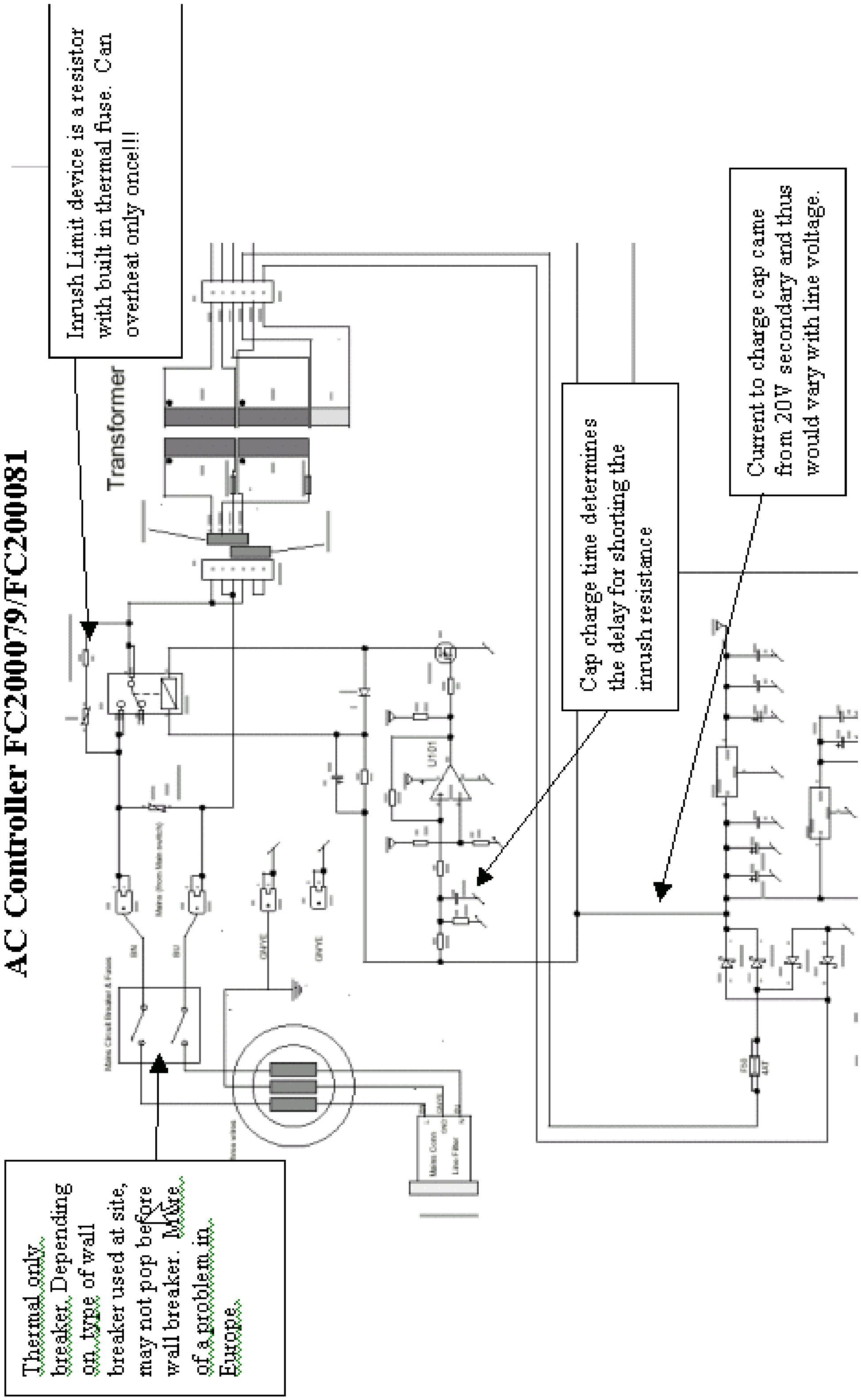


Figure 5-40 Conntectors on Back of AC Controller

5-13-4 AC Controller Differences



AC Controller FC200079/FC200081

Inrush Limit device is a resistor with built in thermal fuse. Can overheat only once!!

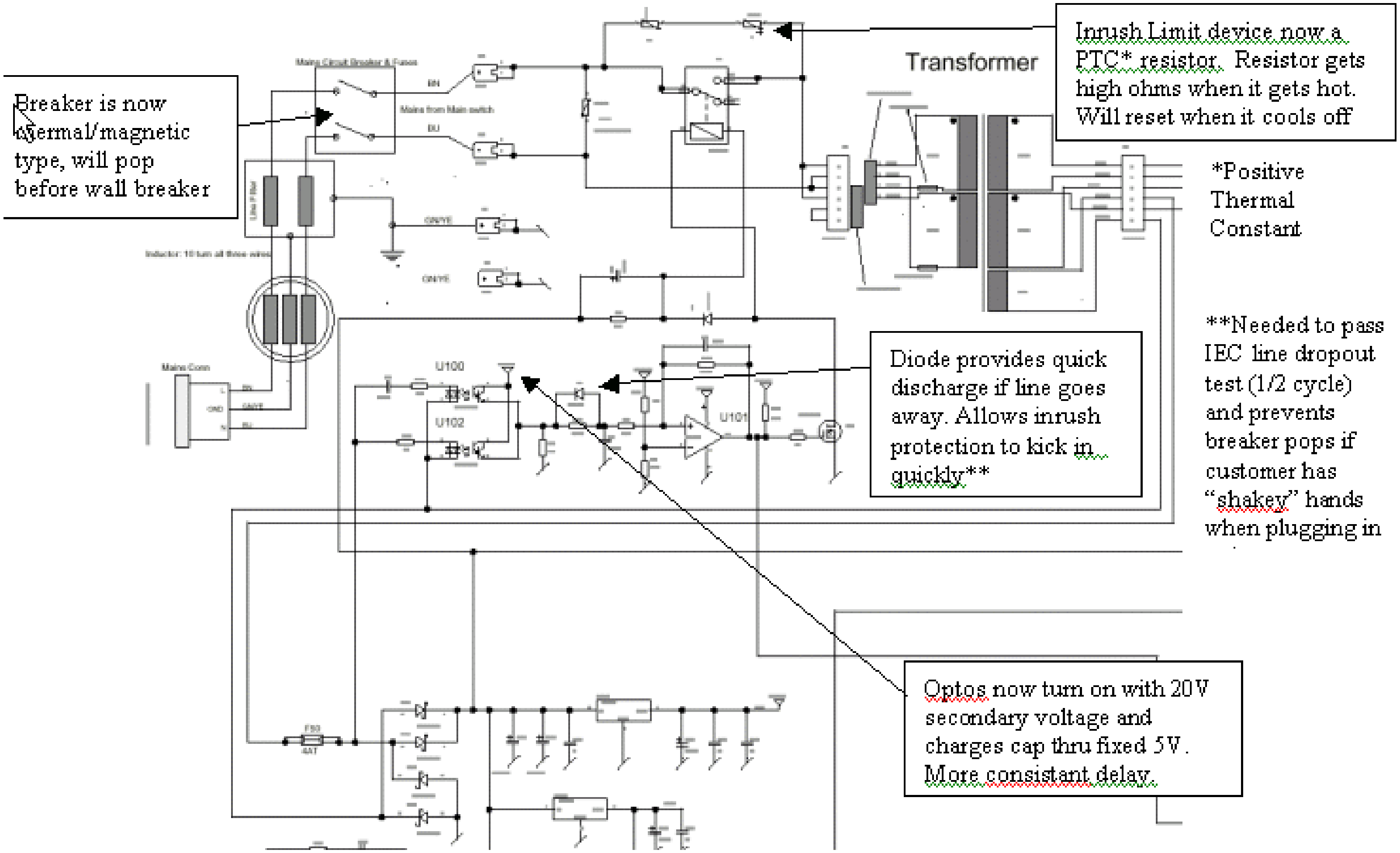
Cap charge time determines the delay for shorting the inrush resistance

Current to charge cap came from 20V secondary and thus would vary with line voltage.

Thermal only breaker. Depending on type of wall breaker used at site, may not pop before wall breaker. More of a problem in Europe.

Figure 5-41 Original AC Controller Functions

AC Controller FC200403/FC200404



Breaker is now thermal/magnetic type, will pop before wall breaker

Inrush Limit device now a PTC* resistor. Resistor gets high ohms when it gets hot. Will reset when it cools off

*Positive Thermal Constant

Diode provides quick discharge if line goes away. Allows inrush protection to kick in quickly**

**Needed to pass IEC line dropout test (1/2 cycle) and prevents breaker pops if customer has "shakey" hands when plugging in

Optos now turn on with 20V secondary voltage and charges cap thru fixed 5V. More consistant delay.

Figure 5-42

Section 5-14
Mechanical Descriptions

5-14-1 Monitor

- Tilt: 10° forwards and backwards
- Swivel: 90° rotation.

5-14-2 Top Console Positioning

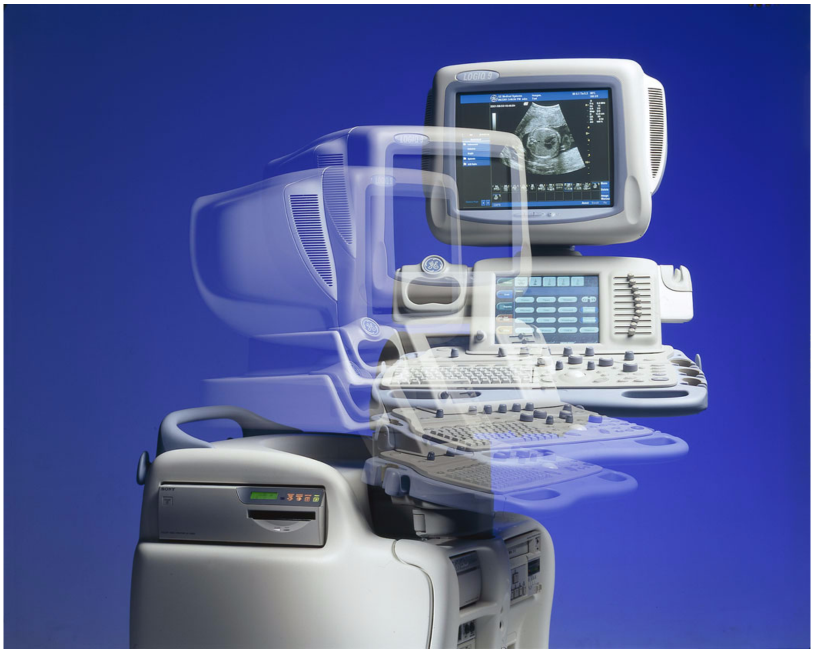


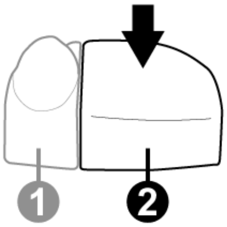
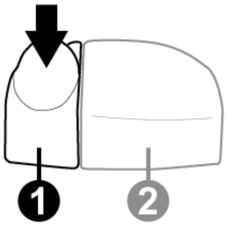
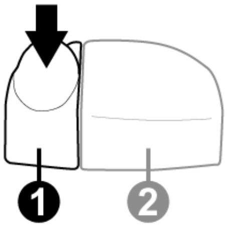
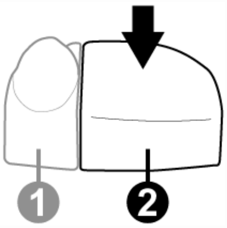
Figure 5-43 Top Console Positioning

- Vertical Access: The control panel offers 27 inches (200 mm) of vertical adjustment.
- Horizontal Access: The control panel offers 45° of horizontal adjustment when the Z-arm is released.

5-14-3 Wheels/Brakes

Check that the brakes and direction locks function as described below.

Table 5-33 Brakes and Direction Lock Instructions

Step	Task	Expected Result(s)	If Not, Remedy
1.	Press on pedal no. 2 	To engage the brakes in full lock	Test Rods Bolts and nuts and wheel rubber as described in Brake Adjustment on page 6-14.
2.	Press on pedal no.1 	To release the brake	
3.	Press on pedal no.1 	To engage swivel lock. You may need to move the system around a little to get the wheels to lock into the locked direction.	
4.	Press on pedal no. 2 	To release swivel lock	

NOTE: *The swivel lock and brake cannot be engaged (pressed down) at the same time since pressing the main brake releases the swivel lock and pressing the swivel lock releases the main brake. Therefore, if the swivel lock is engaged you need to press the main brake pedal (#2)* ***twice*** *to lock the scanner from rolling. Once will release the swivel lock and once again will engage the main brake in full lock as stated in step 1.*

Section 5-15
Air Flow Control

5-15-1 Air Flow Distribution

The fan at the rear of the scanner draws air into the scanner, through the foam filter, and pushes it through a flange that moves the air into a cavity on top of the card rack.

Air holes in the bottom of this cavity allow the air to move down through the card rack. Air exits the card rack through holes on its internal side panel into the interior of the scanner near the rear of the Backend Processor.

The internal fan in the Backend processor draws the air into the PC allowing it to pass through the interior of the PC, and exit the lower front area of the scanner.

Section 5-16
Service Platform

5-16-1 Introduction

The Service Platform contains a set of software modules that are common to all ultrasound and cardiology systems containing a PC backend. This web-enabled technology provides linkage to e-Services, e-Commerce, and the iCenter, making GE's scanners more *e-enabled* than ever. The Service Platform will increase service productivity and reduce training and service costs.

5-16-2 *iLinq* Interactive Platform Features

Many of the services of the Service Platform come from its integration with *iLinq*. The following sections contain a brief introduction of *iLinq's* features. Detailed information can be found in the LOGIQ™ 9 User Manual. (Direction 2309819-100.)

5-16-2-1 Web Server/Browser

The Service platform and other Service software use the *iLinq* web server and the Netscape® browser.

5-16-2-2 Connectivity*

This feature provides basic connectivity between the scanner and the OnLine Center (OLC).

5-16-2-3 Configuration

This feature provides for the interfaces to configure various *iLinq* parameters.

5-16-2-4 Contact GE*

Allows for an on-screen one-touch button used to contact the OnLine Center and describe problems with their scanner in an easy and convenient way.

5-16-2-5 Interactive Application

The main application is displayed in the form of HTML pages whenever the Netscape® browser starts. This is the entry point for any user to start any *iLinq* application.

NOTE: ** These features that allow the customer to contact the GE OnLine Center are available for Warranty and Contract customers only.*

5-16-3 Global Service User Interface (GSUI)

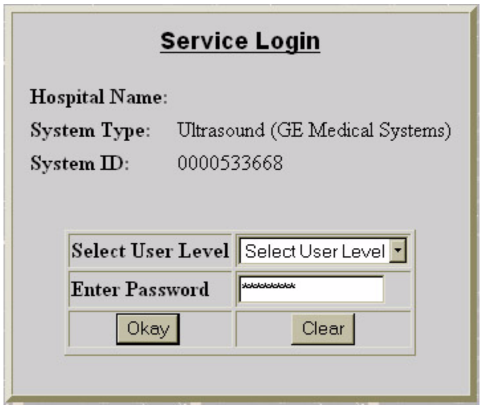
5-16-3-1 Internationalization

The user interface provided by the service platform is designed for GE personnel and as such is in English only. There is no multi-lingual capability built into the Service Interface.

5-16-3-2 Service Login

Select the wrench icon in the status bar at the bottom of the scan display screen.

This icon links the user or the Field Engineer (FE) to the service login screen.



Service Login

Hospital Name:
System Type: Ultrasound (GE Medical Systems)
System ID: 0000533668

Select User Level: Select User Level
Enter Password: ********

Figure 5-44 Login Screen for Global Service User Interface

5-16-3-3 Access / Security

The service interface has different access and security user levels. Each user is only granted access to the tools that are authorized for their use.

NOTE: *A Service Dongle (part number **066E0703**) is necessary for use by GE Service when performing proprietary level diagnostics. OnLine Center access to the scanner requires the password and they must have '**Disruptive**' permission and customer input to run diagnostics.*

Table 5-34 Service Login User Levels

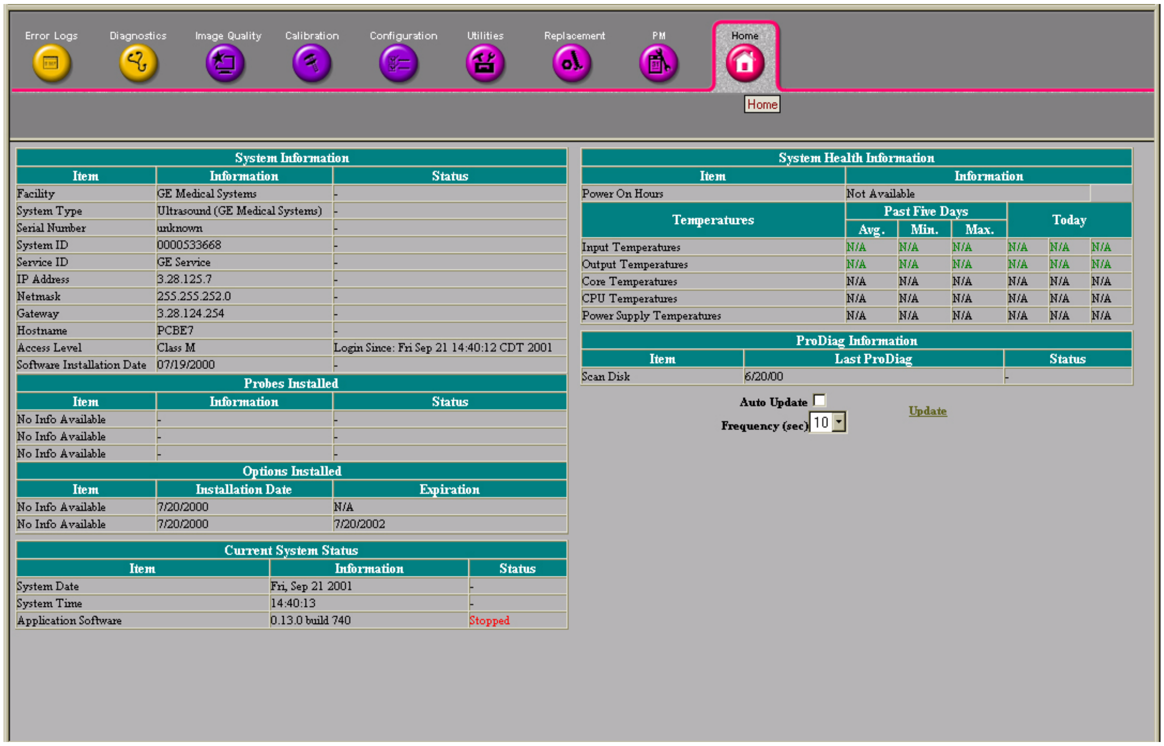
User Level	Access Authorization	Password
Operator	Authorized acccess to specified diagnostics, error logs and utilities. Same acquisition diagnostic tests as GE Service.	uls
Administrator		uls
External Service		gogems
GE Service	Knowledge of a service level password. A physical Service Key (Dongle) required	rotating security password

NOTE: *For a GE Field Engineer, the password changes at specific intervals. Access with the password is tied to the service key.*

Every access request, whether successful or not, will be logged into a service access log that is viewable to authorized users.

5-16-4 Service Home Page

When the Service Interface is started, the Service Home Page appears. The Home Page contains the software revision along with the hardware inventory and the results of the latest System Health Information. The navigation bar at the top of the screen allows the user to select from several tools and utilities.



System Information

Item	Information	Status
Facility	GE Medical Systems	-
System Type	Ultrasound (GE Medical Systems)	-
Serial Number	unknown	-
System ID	0000533668	-
Service ID	GE Service	-
IP Address	3.28.125.7	-
Netmask	255.255.252.0	-
Gateway	3.28.124.254	-
Hostname	PCBE7	-
Access Level	Class M	Login Since: Fri Sep 21 14:40:12 CDT 2001
Software Installation Date	07/19/2000	-

Probes Installed

Item	Information	Status
No Info Available	-	-
No Info Available	-	-
No Info Available	-	-

Options Installed

Item	Installation Date	Expiration
No Info Available	7/20/2000	N/A
No Info Available	7/20/2000	7/20/2002

Current System Status

Item	Information	Status
System Date	Fri, Sep 21 2001	-
System Time	14:40:13	-
Application Software	0.13.0 build 740	Stopped

System Health Information

Item	Information
Power On Hours	Not Available

Temperatures	Past Five Days			Today		
	Avg.	Min.	Max.			
Input Temperatures	N/A	N/A	N/A	N/A	N/A	N/A
Output Temperatures	N/A	N/A	N/A	N/A	N/A	N/A
Core Temperatures	N/A	N/A	N/A	N/A	N/A	N/A
CPU Temperatures	N/A	N/A	N/A	N/A	N/A	N/A
Power Supply Temperatures	N/A	N/A	N/A	N/A	N/A	N/A

ProDiag Information

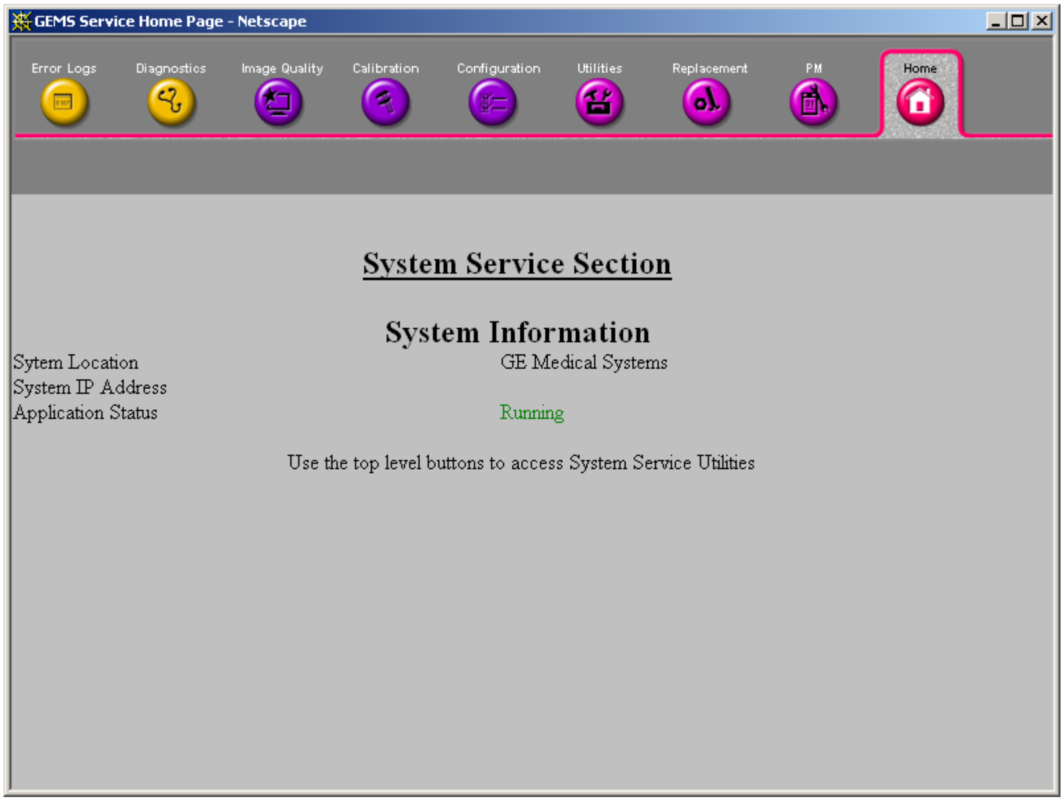
Item	Last ProDiag	Status
Scan Disk	6/20/00	-

Auto Update ☐

Frequency (sec) 10

Update

Figure 5-45 GE Service Home Page



System Service Section

System Information

Sytem Location GE Medical Systems
System IP Address
Application Status Running

Use the top level buttons to access System Service Utilities

Figure 5-46 Customer Service Home Page

5-16-5 Error Logs Tab

From the Error Logs Tab the Log Viewer displays four categories with pull-down sub-menus and an Exit selection. The Service Interface allows scanner logs to be viewed by all service users.

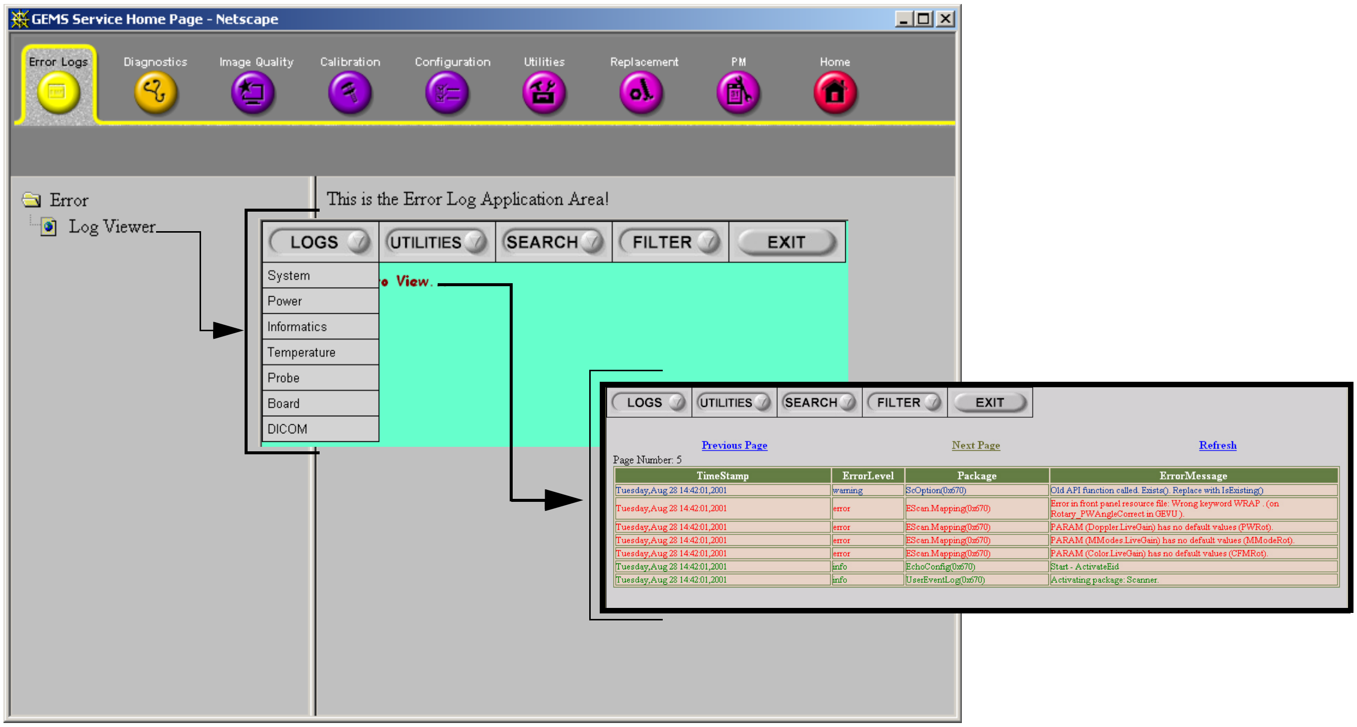
The **Filter** Error log is keyed to GE Service login access permissions and is not available to customer level analysis.

The log entries are color-coded to identify the error level severity at a glance.

Table 5-35 Log Entry Key

Severity	Error Level	Color Code
1	Information	Green
2	Warning	Blue
3	Error	Red

The Service Interface supports the transfer of these logs to local destinations such as the MOD, and CD-ROM drive.



Page Number: 5

TimeStamp	ErrorLevel	Package	ErrorMessage
Tuesday,Aug 28 14:42:01,2001	warning	ScOption(0x670)	Old API function called. Exists(). Replace with IsExisting()
Tuesday,Aug 28 14:42:01,2001	error	EScan.Mapping(0x670)	Error in front panel resource file: Wrong keyword WRAP . (on Rotary_PWAngleCorrect in GEVU).
Tuesday,Aug 28 14:42:01,2001	error	EScan.Mapping(0x670)	PARAM (Doppler.LiveGain) has no default values (PWRot).
Tuesday,Aug 28 14:42:01,2001	error	EScan.Mapping(0x670)	PARAM (MModes.LiveGain) has no default values (MModeRot).
Tuesday,Aug 28 14:42:01,2001	error	EScan.Mapping(0x670)	PARAM (Color.LiveGain) has no default values (CFMRot).
Tuesday,Aug 28 14:42:01,2001	info	EchoConfig(0x670)	Start - ActivateEid
Tuesday,Aug 28 14:42:01,2001	info	UserEventLog(0x670)	Activating package: Scanner.

Figure 5-47 Log Viewer / Logs / Log Entries

5-16-5-1 Logs

The seven sub-menus of the Logs category are System, Power, Infomatics, Temperature, Probe, Board, and DICOM.

NOTE: Figure 5-47 provides a graphical example of the log entries for the ***System Logs****.*

Log table headings for the differrent logs are as follows:

- **System**
  Log entry headings include Time Stamp; Error Level; Package; and Error Message.
- **Power**
  Log entry headings include Time Stamp; Error Level; Package; and Error Message.
- **Infomatics**
  Log entry headings include TimeStamp, Revision, PtID, PtDOB, PtSex, PtWeight, PtHeight, ExamID, Exam Category, ExamCurDate, and ExamStartTime.
- **Temperature**
  Log entry headings include Time Stamp; Error Level; Package; Upper FEC Sensor; and Lower FEC Sensor.
- **Probe**
  Log entry headings include Time Stamp; Error Level; Package; Error Message; Severity; Revision; and three (3) new labels that have not yet been named.
- **Board**
  Log entry headings include Time Stamp; Error Level; Package; Board; Severity; and two (2) new labels that have yet been named.
- **DICOM**
  Log entry headings include Time Stamp; Error Level; Package; and Error Message.

5-16-5-2 Utilities

The two sub-menus of the **Utilities** category are Plot Log, and Plot Page.

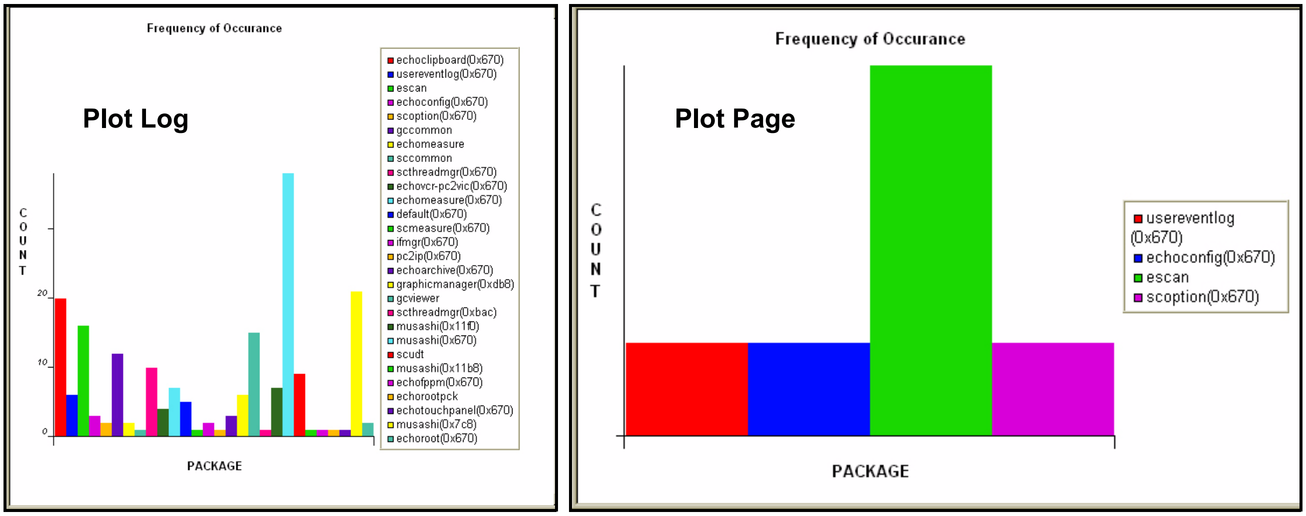


Figure 5-48 Utilities Sub-Menus

- **Plot Log**

  Allows for the color coded plot of all Log contents with the package on the ‘x’ axis and incident count on the ‘y’ axis.

- **Plot Page**

  Allows for the color coded plot of all Page contents with the package on the ‘x’ axis and incident count on the ‘y’ axis.

5-16-5-3 Search

On the Text Search sub-menu of the **Search** category, users enter case-sensitive text they wish to find. This filter field works well for filtering the Sys log file for the word “fail”.

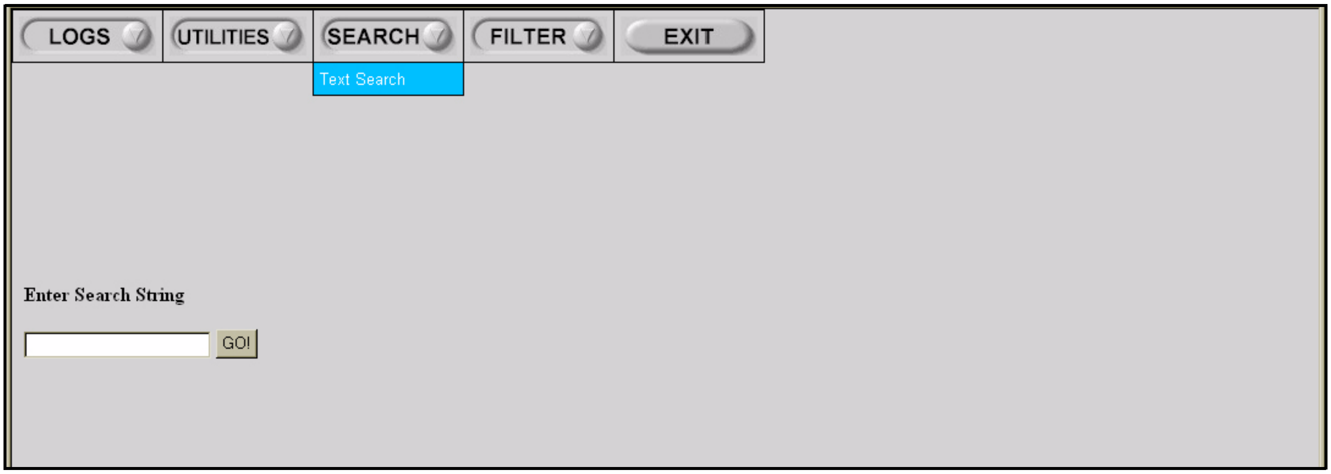


Figure 5-49 Search Sub-Menu

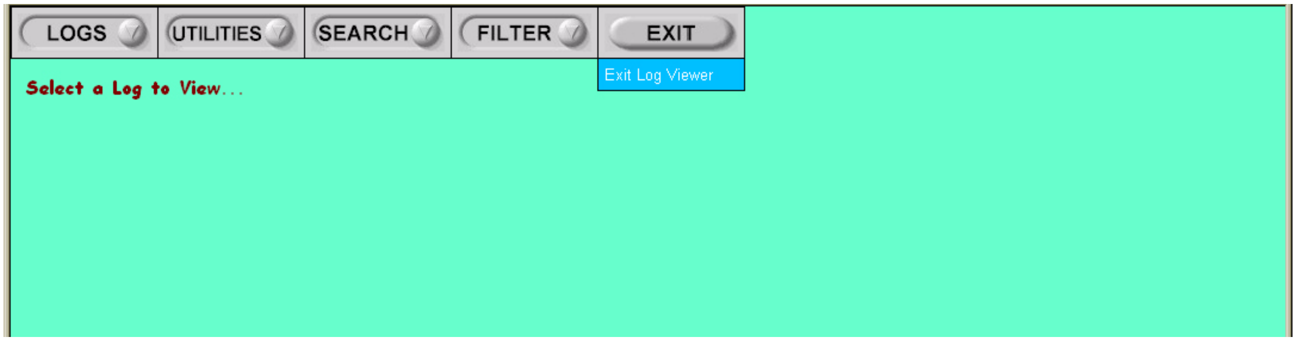
5-16-5-4 Filter

Filtering is used to extract select data from the Error Logs. The capability to **Filter** is keyed to the login permissions of the user.

NOTE: Only GE Service personnel may ***Filter*** *the Logs.*

5-16-5-5 Exit

The sub-menu, **Exit Log Viewer**, returns the user to the Service Desktop home page.

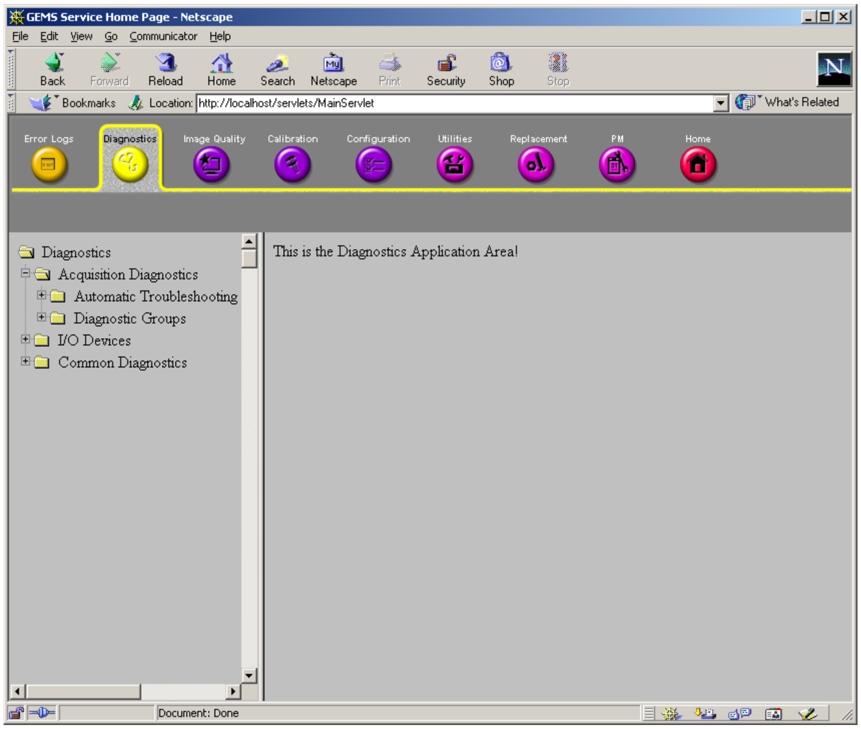


Select a Log to View...

Figure 5-50 Exit Log Sub-Menu

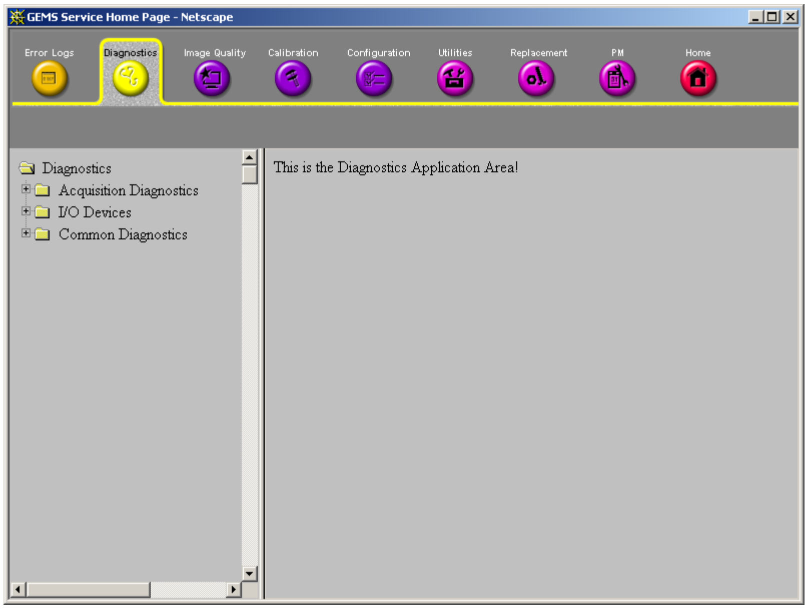
5-16-6 Diagnostics

Detailed **Diagnostic** information is found in **Chapter 7 - Diagnostics/Troubleshooting**.


GEMS Service Home Page - Netscape
File Edit View Go Communicator Help
Back Forward Reload Home Search Netscape Print Security Shop Stop
Bookmarks Location: http://localhost/servlets/MainServlet
What's Related
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Diagnostics
Acquisition Diagnostics
Automatic Troubleshooting
Diagnostic Groups
I/O Devices
Common Diagnostics
Document: Done

This is the Diagnostics Application Area!

Figure 5-51 GE Service Diagnostic Page



This is the Diagnostics Application Area!

Figure 5-52 User Diagnostic Page

5-16-6-1 Diagnostics Execution

Diagnostic tests are executable by both local and remote users. The Service Platform provides top-level diagnostic selection based on the user's level and login access permissions. Remote access will require disruptive diagnostic permissions to run Acquisition diagnostics.

5-16-6-2 Diagnostic Reports

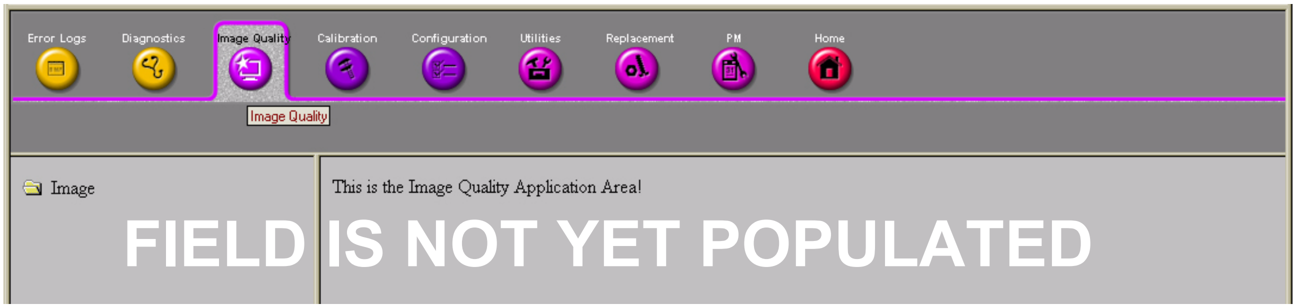
Diagnostic tests return a report to the Service Platform. The platform retains the report and allows for future viewing of the diagnostic logs.

5-16-6-3 Proactive Diagnostics

A system of self-monitoring is largely supported with the integration of *iLinq*. The scheduler, executive, user interfaces, and some of the proactive diagnostic functions are provided by *iLinq*. Other tasks should be provided by the product team.

5-16-7 Image Quality

The **Image Quality** page is intended to contain tools for troubleshooting image quality issues.



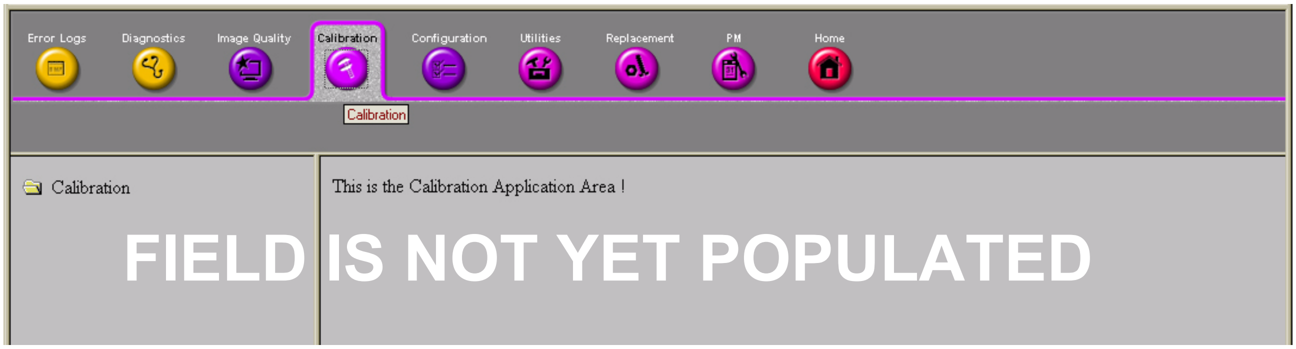
This is the Image Quality Application Area!

FIELD IS NOT YET POPULATED

Figure 5-53 Image Quality Page

5-16-8 Calibration

The **Calibration** page is intended to contain the tools used to calibrate the system.



This is the Calibration Application Area !

FIELD IS NOT YET POPULATED

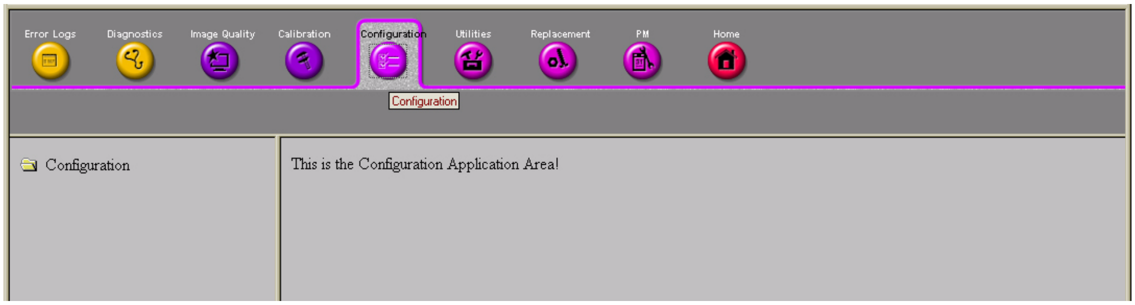
Figure 5-54 Calibration Page

5-16-9 Configuration

The **Configuration** page is intended to be used to setup various configuration files on the system.

The Service Platform is the access and authorization control for remote access to the configuration subsystem.

The enable/disable of software options can be done from this Configuration page.

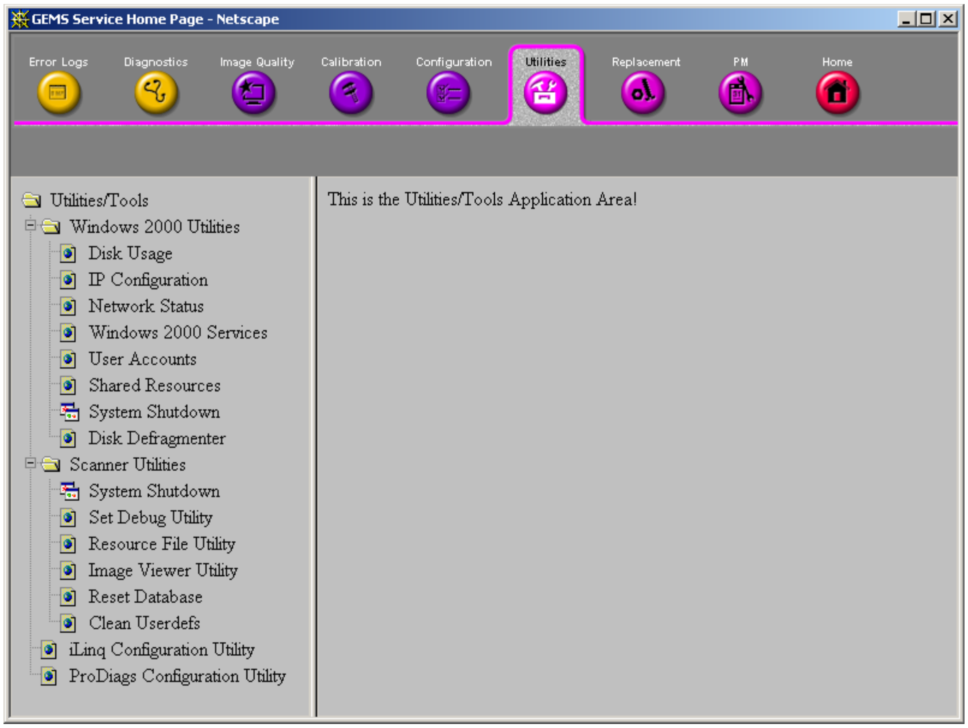


This is the Configuration Application Area!

Figure 5-55 Configuration Page

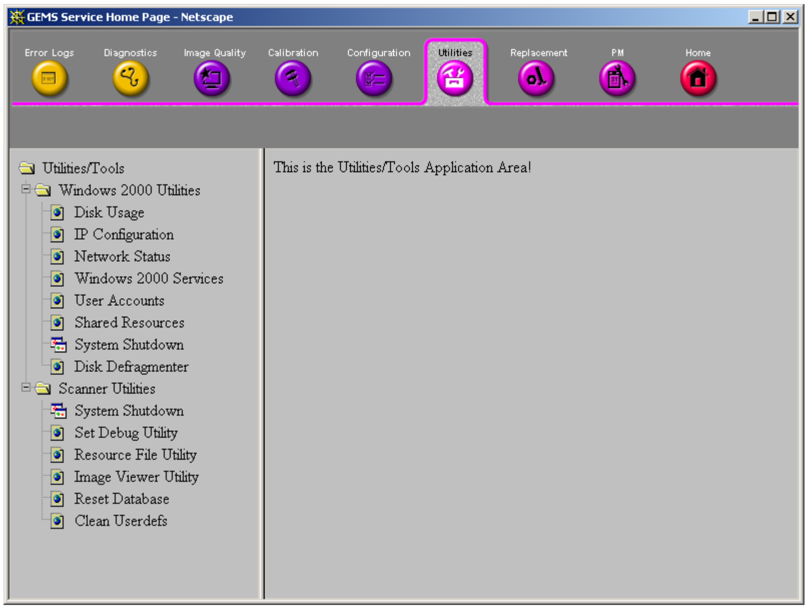
5-16-10 Utilities

The **Utilities** page contains several miscellaneous tools.



This is the Utilities/Tools Application Area!

Figure 5-56 GE Service Utilities Page

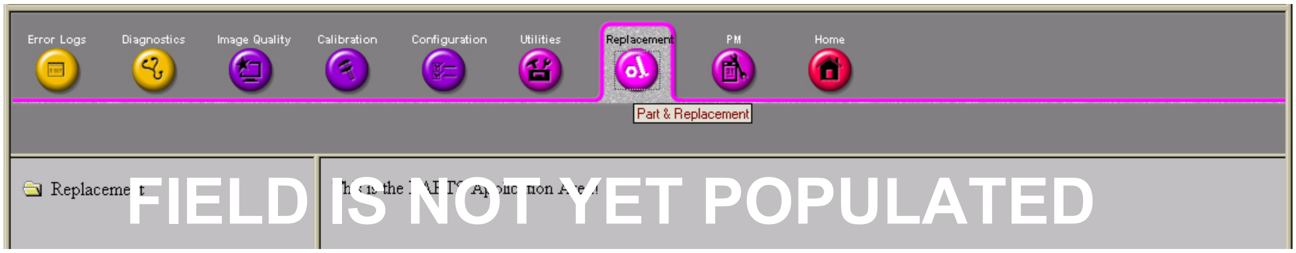


This is the Utilities/Tools Application Area!

Figure 5-57 Customer Utilities Page

5-16-11 Replacement

The **Replacement** page is intended to contain the tools used to track replacement parts used in the system.

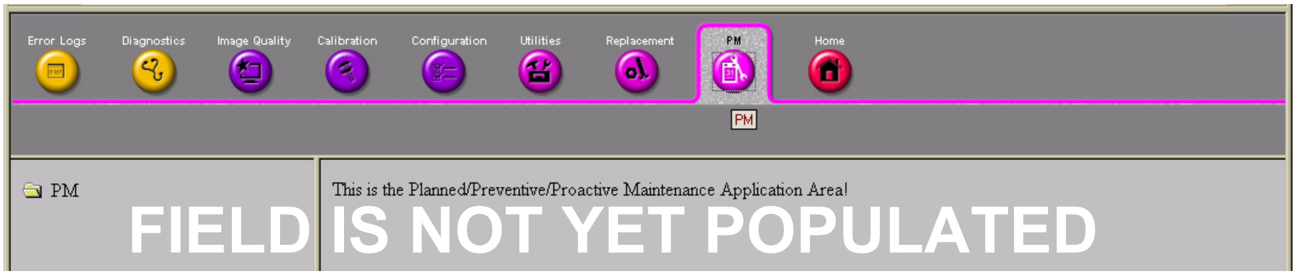


FIELD IS NOT YET POPULATED

Figure 5-58 Part Replacement Page

5-16-12 PM

The **PM** page is intended to contain the tools used in periodic maintenance of the system.



This is the Planned/Preventive/Proactive Maintenance Application Area!

FIELD IS NOT YET POPULATED

Figure 5-59 Planned Maintenance Page

5-16-13 Remote Software/Option Installation and Updates

The Service Platform provides for remote software downloads. Any file transferred to the scanner will be in the form of an installation package. The actual content of the installation package is dependent on each product. The Service Platform downloads the software module into an appropriate directory and executes the product-specific installer executive.

Software installation is simple and automated with a Graphic User Interface (GUI), where applicable.

Supports software upload via remote transmission

Supports software upload via Service Platform

Supports partial upgrades

Supports de-installs of the latest partial upgrade

Supports remote activation/installation of software options

Options can be activated permanently

Options can be activated for a timed period

Options can be limited to a number of uses

Options that expire must give notice to the user that the option has expired

5-16-13-1 Remote System Shutdown and Restart

The Service Platform provides the ability to restart the system as per standard shutdown/startup procedures. Remote shutdown will only be provided if a software-controlled shutdown exists on the scanner. Scanner system restart is always accessible from the OLC.

5-16-13-2 File and/or Image Transfer

The Service Platform supports file transfers and archived image transfers to the OnLine Center. The Service Platform provides interfaces of the displayed images for transfer to the OLC.

Chapter 6
Service Adjustments

Section 6-1
Overview

6-1-1 Purpose of Chapter 6

This chapter describes how to test and adjust the mechanical capabilities of a scanner that may be out of specification. Although some tests may be optional they should only be performed by qualified personnel.

Table 6-1 Chapter 6 Contents

Section	Description	Page Number
6-1	Overview	6-1
6-2	Regulatory	6-1
6-3	Monitor	6-2
6-4	Touch Panel Calibration	6-5
6-5	Z-Release Cable and Gas Spring Adjustment	6-6
6-6	Brake Arm Adjustment	6-12
6-7	Brake Adjustment	6-14

Section 6-2
Regulatory

Verify, where applicable, that any regulatory information or tests required by national law are present and accounted for, and any regulatory tests required by national law are performed *and* documented.

Section 6-3
Monitor

6-3-1 Monitor Adjustment

Contrast, brightness and degauss are adjusted using the three (3) keys located on the front of the monitor just below the screen.

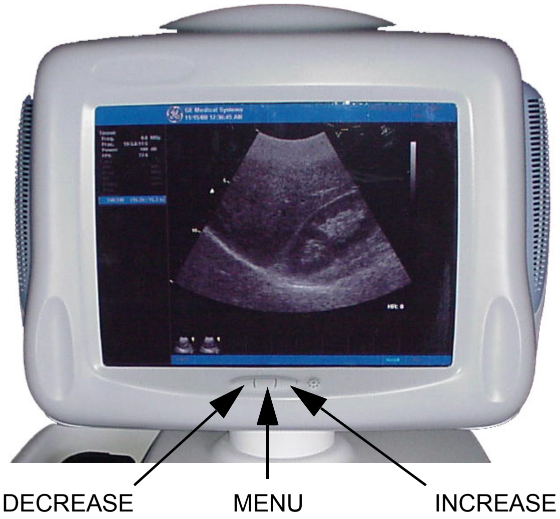
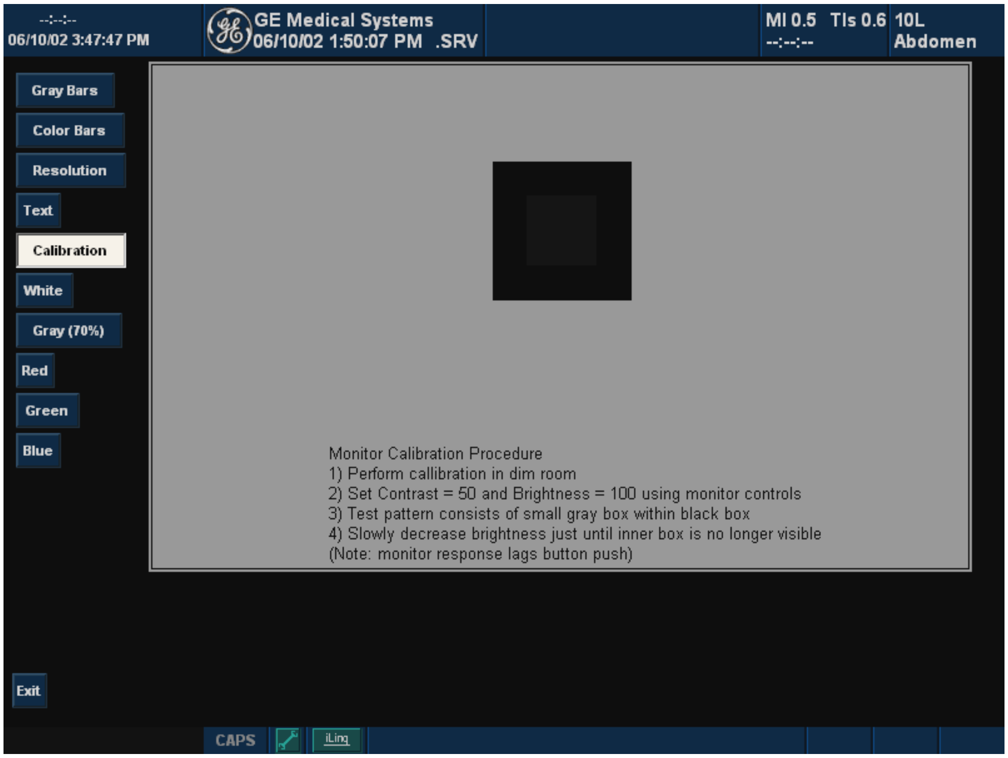


Figure 6-1 Monitor Adjustment Switches

By pressing either the increase button or decrease button the degauss menu appears. Pressing the menu button will degauss the monitor. If you do not wish to degauss the monitor, again press either the decrease button or increase button and the monitor will return to the default screen.

To calibrate brightness and contrast, go to Utility>Test Patterns>Calibration. The screen display will change as shown in Figure 6-2 on page 6-3 .

Section 6-3 Monitor (cont'd)



Monitor Calibration Procedure
1) Perform callibration in dim room
2) Set Contrast = 50 and Brightness = 100 using monitor controls
3) Test pattern consists of small gray box within black box
4) Slowly decrease brightness just until inner box is no longer visible
(Note: monitor response lags button push)

Figure 6-2 Monitor Brightness/Contrast Calibration Test Pattern

Follow the instructions on the screen. Press the menu button (middle) to adjust the Contrast to 50. Press the menu button again and adjust the Brightness to 100. Decrease the Brightness setting untill the inner gray is the same shade as the black box that surrounds it. This brightness setting should range between 35 to 55.

Final adjustment relies on customer approval. Cameras and printers may need to be adjusted to match any monitor changes.

6-3-2 Monitor Tilt

The monitor is capable of a full 10° forward and backward tilt. Although the default setting of the tilt tension on the monitor should be adequate to tilt the monitor for your viewing preference, it can be easily adjusted.

The monitor chassis is attached to the monitor mount plate that has a shaft that inserts into the top plate of the scanner. This feature allows the monitor to swivel without need for adjustment.

The monitor mount plate has two points for adjustment.

6-3-2-1 Monitor Tilt Adjustment Procedure

Passing through the monitor mount plate on its underside is a large bolt, with a locking nut on its left side, that provides the tension for monitor tilt. Adjust the tilt tension by loosening or tightening the locking nut on this bolt.

NOTE: *The right side of this bolt will receive an Allen wrench to provide resistance when loosening and tightening the locking nut.*

6-3-2-2 Monitor Counter-balance Adjustment Procedure

At the back of the monitor mount plate is a nut securing a bolt passing through the shaft. This bolt has a tapered end and several spring washers that when seated into the cylinder provides a proper counter-balance for the monitor.

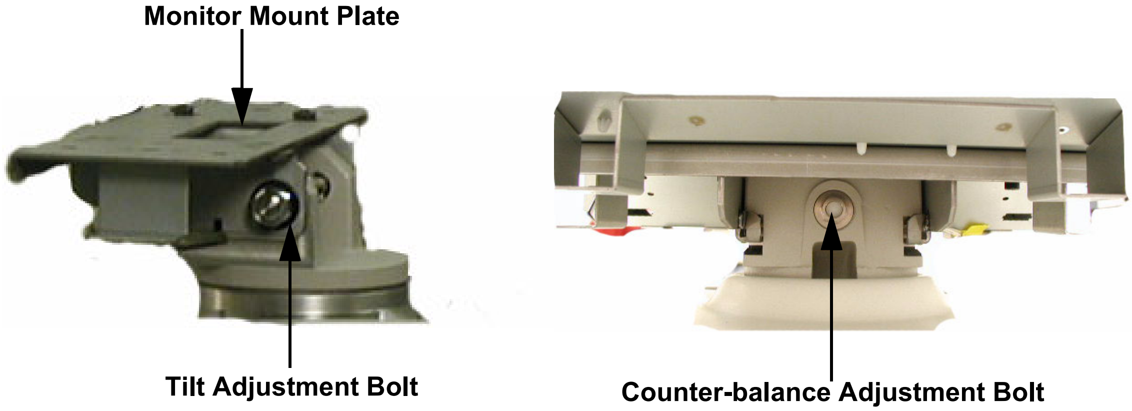


Figure 6-3 Monitor Tilt Tension Adjustment

6-3-2-3 Tools

Phillips screwdriver

Open-ended wrenches

6-3-2-4 Manpower

1 person, 1 hour + travel or

2 people, 1 hour + travel if the monitor needs to be removed.

6-3-2-5 Procedure

1.) Raise the Control Panel to a height that allows you to work underneath the monitor.
2.) Remove the eight (8) Phillips screws holding the Under Shelf Cover to the Shelf Cover Assembly.
3.) Remove four (4) Phillips screws holding the monitor Rear Cover Assembly to the monitor chassis.
4.) You now have access the monitor tilt and counter-balance adjustments. Adjust accordingly.
5.) Install the monitor rear cover assembly to the monitor chassis.
6.) Position the shelf cover assembly and secure it in place with the Under Shelf Cover and the eight Phillips screws.

Section 6-4
Touch Panel Calibration

The Touch Panel Adjustment/Calibration procedure can be found in Section 7-7-4-10 *“Calibration Utilities” on page 7-34*.

Section 6-5
Z-Release Cable and Gas Spring Adjustment

Select the movie camera icon to view the video of the z- release cable and gas spring adjustment procedure.

4 minutes and 47 seconds

The operator panel can move up and down (Z direction). A gas spring in the scanner provides a counter force to "balance" the weight of the operator panel and allows for positioning with minimal effort. A lever on the main handle has a cable (similar to a bicycle cable) that provides the release for the gas spring. This cable has one end attached to the release lever and the other end attached to the mechanism on the gas spring piston.

6-5-1 Time Required

Approximately 1 person for 1 hour plus travel.

6-5-2 Tools

Phillips screwdriver

10mm open-end wrench

Two (2) small slotted screwdrivers

Needle-nose pliers

Small ruler

Large slotted screwdriver

3mm Allen wrench

6-5-3 Preparations

⚠ **DANGER** **DANGEROUS VOLTAGES ARE PRESENT IN THIS EQUIPMENT. COMPLETELY POWER OFF AND SHUTDOWN THE SCANNER BEFORE SERVICING.**

1.) Power Off / Shutdown the scanner as described in Section 4-3-2 *“Power Off / Shutdown” on page 4-3*.

6-5-4 Z-Release Cable Adjustment

CAUTION **Before making any adjustments, check the Z-release system to determine what adjustments need to be made.**

6-5-4-1 Checking the Release System

1.) Squeeze the Z-release lever and move the operator panel to its highest position. If this is not possible, perform the necessary steps in Emergency Release Procedure on page 6-11.

2.) Place a small ruler next to the Z-release lever as shown in the Figure 6-4 below.

3.) Gently wiggle the Z-release lever and measure the amount of play in the lever.

4.) If this amount is 3mm or more, there is too much play in the cable. Perform the steps in the section Z-Release Cable Adjustment on page 6-7 to reduce the amount of play in the cable.

5.) Attempt to lower the operator panel by pushing down on it. The operator panel should not move. While continuing to push down, slowly squeeze the Z-release lever.

6.) Note the position of the Z-release lever when the operator panel starts to move. It should be 1/4 to 2/3 of the lever's range of motion. If the operator panel moves without squeezing the Z-release lever, or if you have to almost fully squeeze the lever before motion is allowed, perform the steps in section Gas Spring Adjustment on page 6-10.

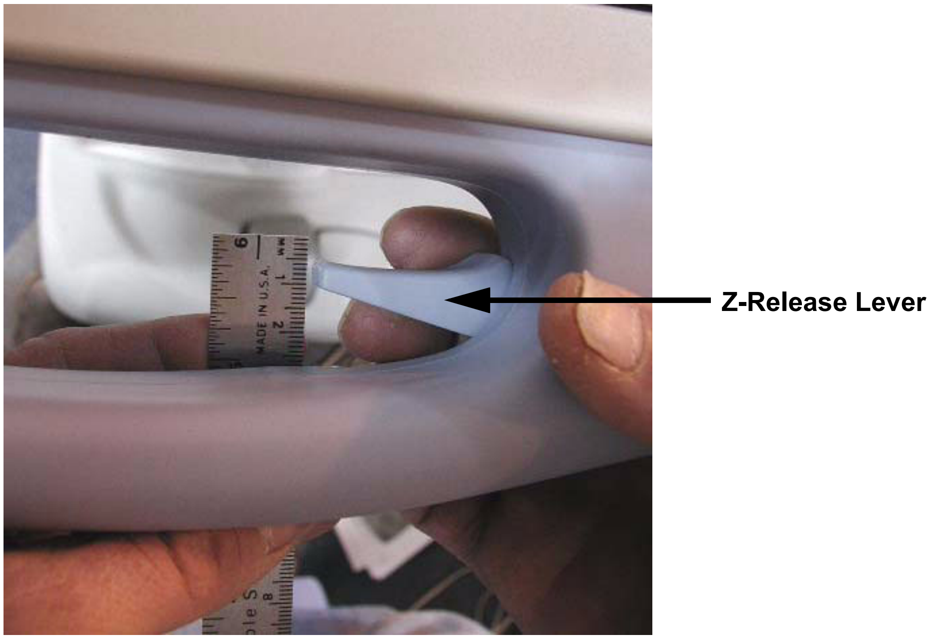


Figure 6-4 Z-Release Measurement

6-5-4-2 Cable Adjustment

1.) From underneath the handle use a 10mm open-end (small “ignition” style) wrench to screw **in** the cable adjustment screw to tighten the Z-release cable.

2.) If you cannot remove enough of the play in the cable using this adjustment, see Cable Adjustment at Gas Spring on page 6-8

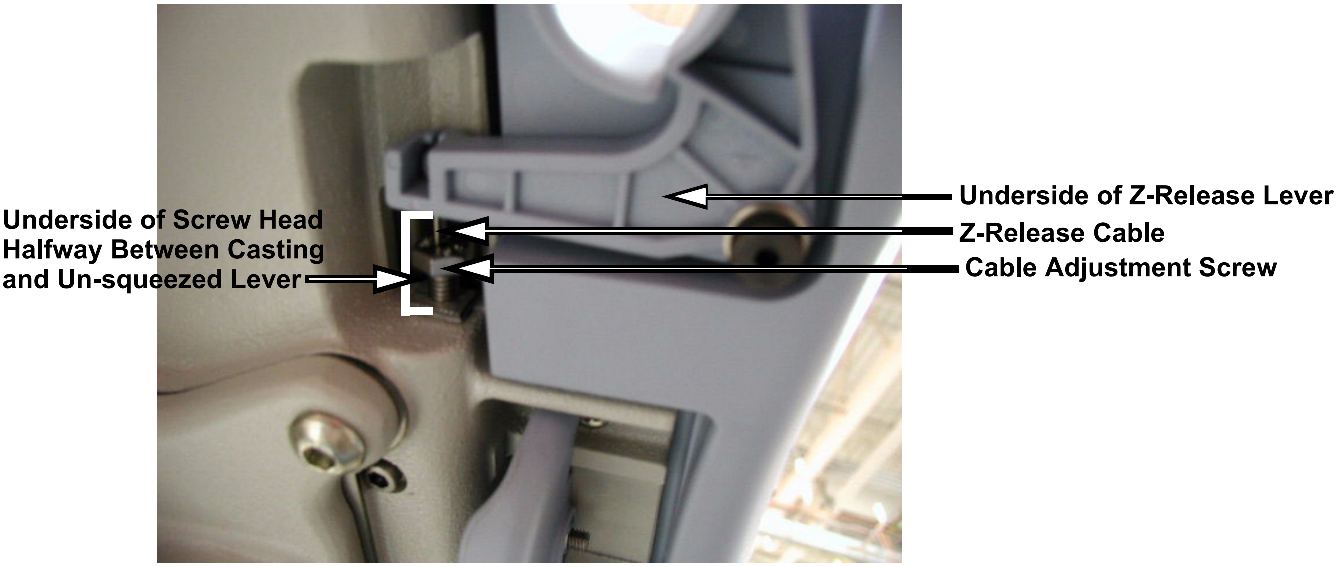

Underside of Z-Release Lever
Z-Release Cable
Cable Adjustment Screw
Underside of Screw Head Halfway Between Casting and Un-squeezed Lever

Figure 6-5 Z-Release Cable Adjustment Screw

6-5-5 Cable Adjustment at Gas Spring

6-5-5-1 Preparations

1.) If not already performed, Power Off / Shutdown the scanner as described in Section 4-3-2 *“Power Off / Shutdown” on page 4-3*.

2.) Remove the right- and left-side covers of the scanner as described in Section 8-2-2 *“Side Covers (with Bumper) Replacement Procedure” on page 8-5*.

3.) Remove the front cover of the scanner as described in Section 8-2-5 *“Front Cover Replacement Procedure” on page 8-9*.

4.) Remove the black-and-white printer.

5.) Remove the VCR.

NOTE: The height of the printer and VCR make them difficult to remove without first removing the front cover.

6-5-5-2 Procedure

NOTE: The operator panel must be at or near its highest position.

1.) From underneath the handle use a 10mm open-end (small "ignition" style) wrench to screw **out** the cable adjustment screw so the underside of the screw head is about half way between the casting and the unsqueezed lever. See Figure 6-5 on page 6-8 .

2.) There is a Wire Clamp nestled in the Forked Retainer. Refer to Figure 6-6. Using 2 slotted screwdrivers (one on each side of the clamp) loosen the clamp.

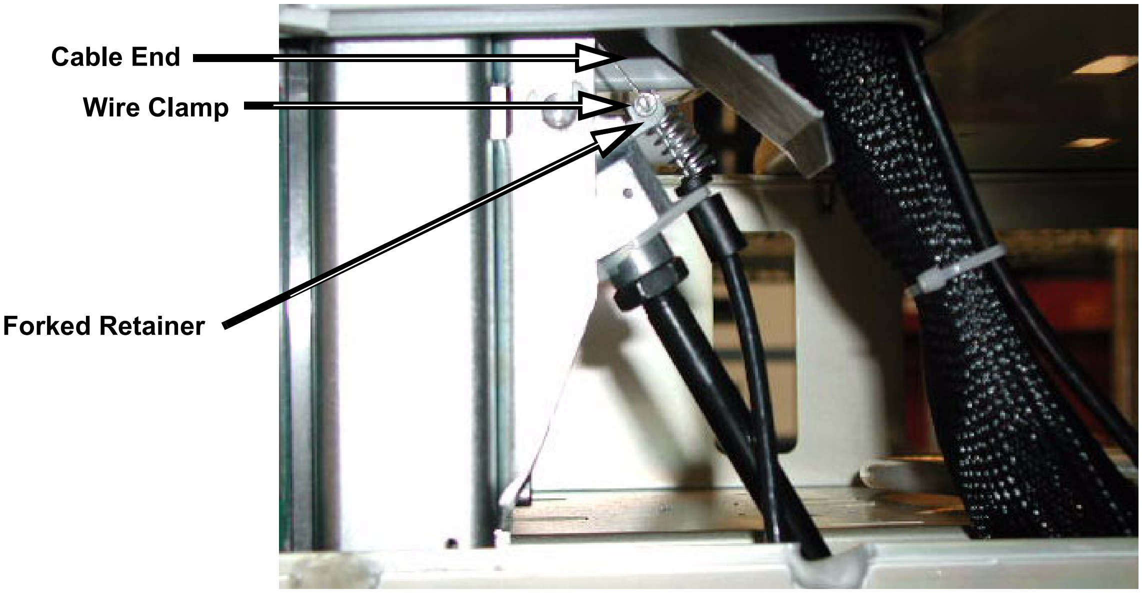


Figure 6-6 Gas Spring Mechanism

3.) Using needle nose pliers, hold the cable end which is above the clamp and pull upward to take up any cable slack.

4.) Using one of the two slotted screwdrivers, push the Clamp down along the cable so that it is nestled back in the Forked Retainer.

⚠ **WARNING** ***Do NOT attempt to pinch together or pry apart the forked retainer. If one of the tines should break off, the gas spring piston may have to be replaced at the factory.***

5.) Tighten the clamp with one screwdriver to hold the cable. Let go of the pliers and then use the two screwdrivers to fully tighten the clamp.

6.) Without squeezing the release lever, check that the forked retainer is in its fully up position.

7.) Squeeze the release lever and watch the forked retainer move down immediately as the lever is squeezed, there should be very little play in the cable. Small amounts of play can be taken up (or slackened) with the cable adjustment screw per step 1.

6-5-6 Gas Spring Adjustment

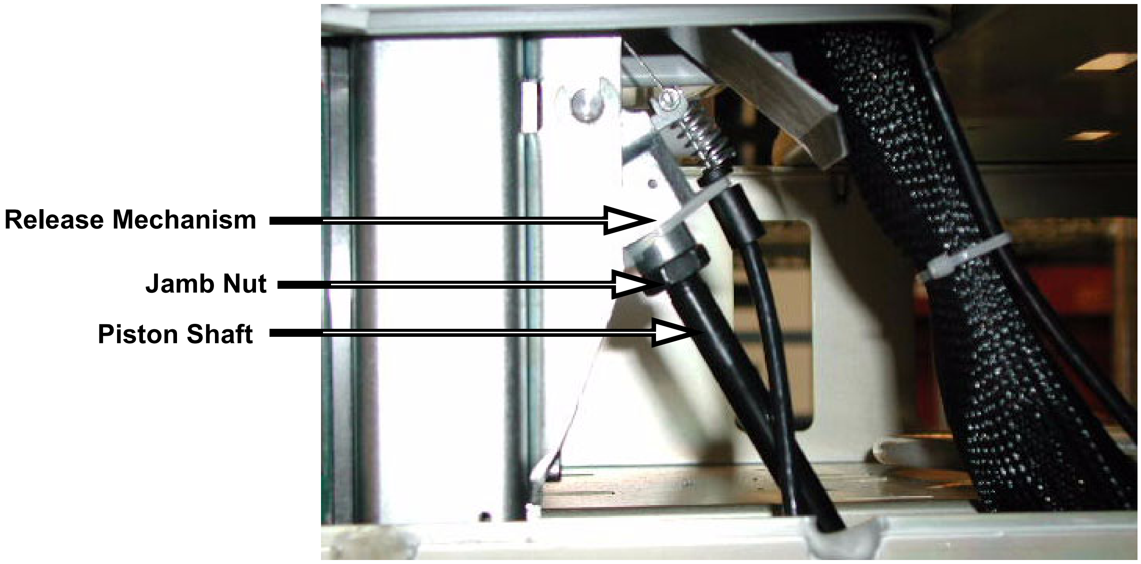


Figure 6-7 Gas Spring Adjustment

1.) Using a 17mm wrench, loosen the Jamb Nut.

2.) Using pliers, grab the Piston Shaft just below the nut and turn the shaft based on the your situation:

  - If the operation panel can move without squeezing the release lever: Turn so that the shaft un-threads from the release mechanism
  - If the operation panel does not move even when squeezing the release lever: Turn so the shaft threads into the release mechanism further

NOTE: Slight turning makes a large difference, turn only ¼ of a turn at a time. The nut will probably turn with the shaft, use it as a guide as to how much you are turning.

3.) Check the operation, push down or pull up on the operator panel handle while slowly squeezing the release lever, motion should start with the lever at 1/4 to 2/3 of the full range of movement. Repeat step 2 as necessary.

4.) Tighten the Jamb nut.

6-5-7 Emergency Release Procedure

Select the movie camera icon to view the video of the emergency release procedure.

1 minute and 58 seconds

When the operator panel is at or near its highest position it is possible to see the gas spring mechanism with the Black and White Printer or the VCR removed. If the operator panel is stuck in the down position, it is not possible to see the gas spring mechanism as it is down behind the card rack. To avoid removing the Card Rack to make adjustments, try this procedure to raise the operator panel.

1.) Using 3mm Allen Wrench, remove the shoulder bolt holding the release lever on the handle.

2.) Tilt the release lever down and pull on the cable as shown in the figure below. This will give unlimited travel and hopefully release the gas spring. Push up on the operator panel while you are pulling on the cable.

⚠ **CAUTION** **Do NOT use excessive force!**

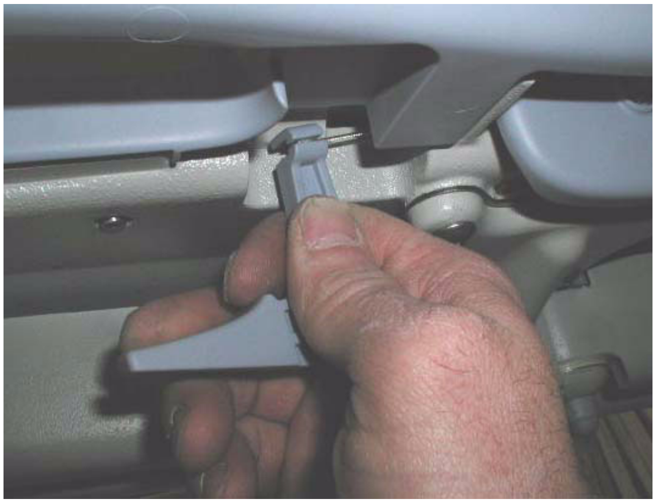


Figure 6-8 Release Lever

3.) If you have no cable to pull (cable broken) or you are unable to release the gas spring in this manner, you must remove the Card Rack to gain access to the gas spring mechanism.

6-5-8 Procedure Completion

1.) Install the VCR.

2.) Install the Black-and-White printer.

3.) Replace the front cover as described in Section 8-2-5 *"Front Cover Replacement Procedure" on page 8-9*.

4.) Replace the side covers as described in Section 8-2-2 *"Side Covers (with Bumper) Replacement Procedure" on page 8-5*.

5.) If required, Power On / Bootup the scanner as described in Section 4-3-1 *"Power On / Boot Up" on page 4-2*.

Section 6-6
Brake Arm Adjustment

Adjustments to the brake arm may be necessary if the pedals do not depress readily nor engage so the front wheels lock in place and do not swivel.

Select the movie camera icon to view the video of the brake arm adjustment procedure.

1 minute and 58 seconds

6-6-1 Tools

Flat-head screwdriver

6-6-2 Manpower

One person, 1 hour + travel

6-6-3 Preparations

1.) Remove the front bumper as described in Front Bumper Replacement Procedure on 8-11.

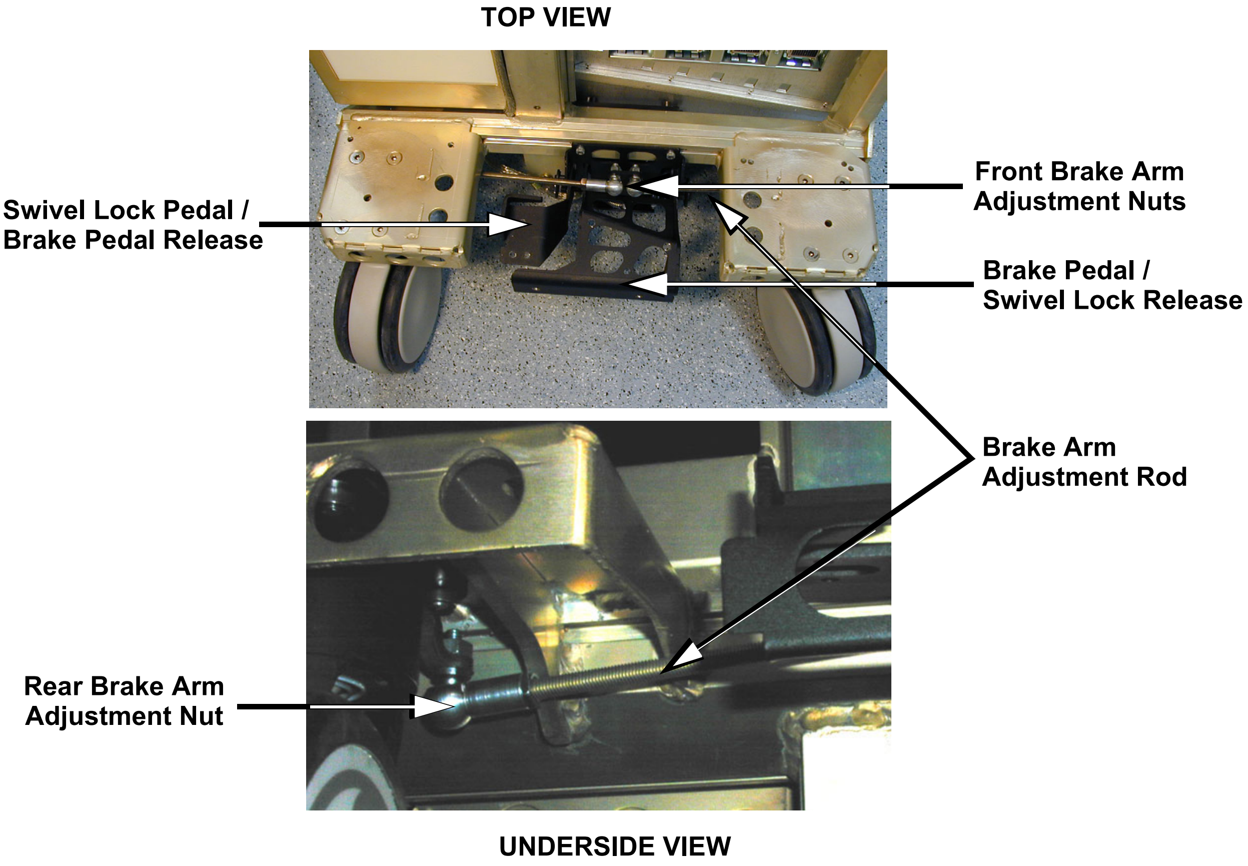

TOP VIEW
Swivel Lock Pedal / Brake Pedal Release
Front Brake Arm Adjustment Nuts
Brake Pedal / Swivel Lock Release
Brake Arm Adjustment Rod
Rear Brake Arm Adjustment Nut
UNDERSIDE VIEW

Figure 6-9 Brake Adjustment

6-6-4 Brake Arm Adjustment Procedure

To adjust the brake arm it is recommended to separate both front adjustment nuts from the brake assembly.

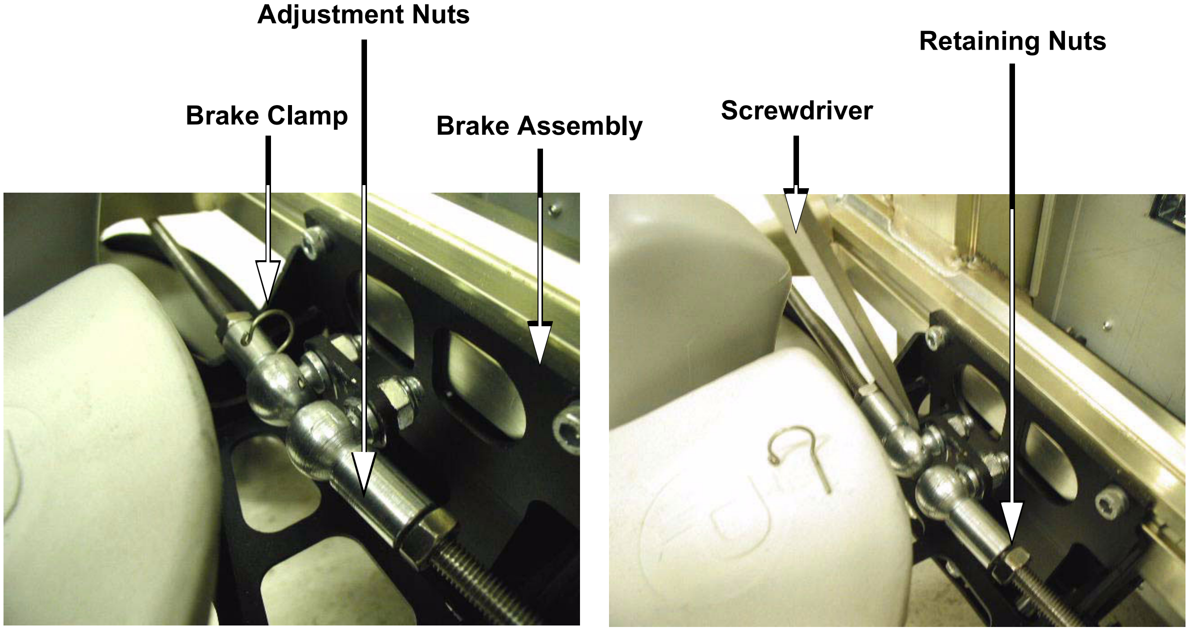


Figure 6-10 Front Adjustment Hardware

2.) Remove the brake clamps that are inserted through a small hole in the front adjustment nuts and slipped over the nut at its collar.

3.) Loosen the front retaining nuts to allow room for adjustments.

4.) With a screwdriver you can pry the front adjustment nuts away from their connectors in the brake assembly.

5.) Set the main brake - the brake assembly should be pulled to the left.

6.) Seat the right adjustment rod into the right adjustment nut under the right front wheel as far as it will go.

7.) Seat the right front adjustment nut onto the adjustment rod as far as it will go.

8.) In order to insure that the same length of adjustment rod is seated into the two adjustment nuts you will turn the adjustment rod one turn out of the rear adjustment nut under the front wheel and turn the front adjustment nut off the adjustment rod a similar turn.

9.) Repeat this alternating rotation until the front adjustment nut lines up easily with the connector in the brake assembly.

10.) Push the adjustment nut onto the brake assembly connector and secure the retaining nut tight against the adjustment nut.

NOTE: Repeat the same procedure to adjust the swivel lock. The only difference would be to set the swivel lock prior to the adjusments.

6-6-5 Procedure Completion

1.) Install the front bumper.

Section 6-7
Brake Adjustment

6-7-1 Front Wheel Brakes

Service adjustment to the front brakes involve setting the brake so it will properly “bite” the rear tire. The default setting should provide proper braking. If not, follow the procedures below.

6-7-1-1 Tools

Allen Wrenches

6-7-1-2 Manpower

One person, 1 hour + travel

6-7-1-3 Preparations

1.) Set the rear brakes to prevent the scanner from rolling.
2.) Remove the front bumper Section 8-2-7 *“Front Bumper Replacement Procedure” on page 8-11*.

6-7-1-4 Front Brake Adjustment Procedure

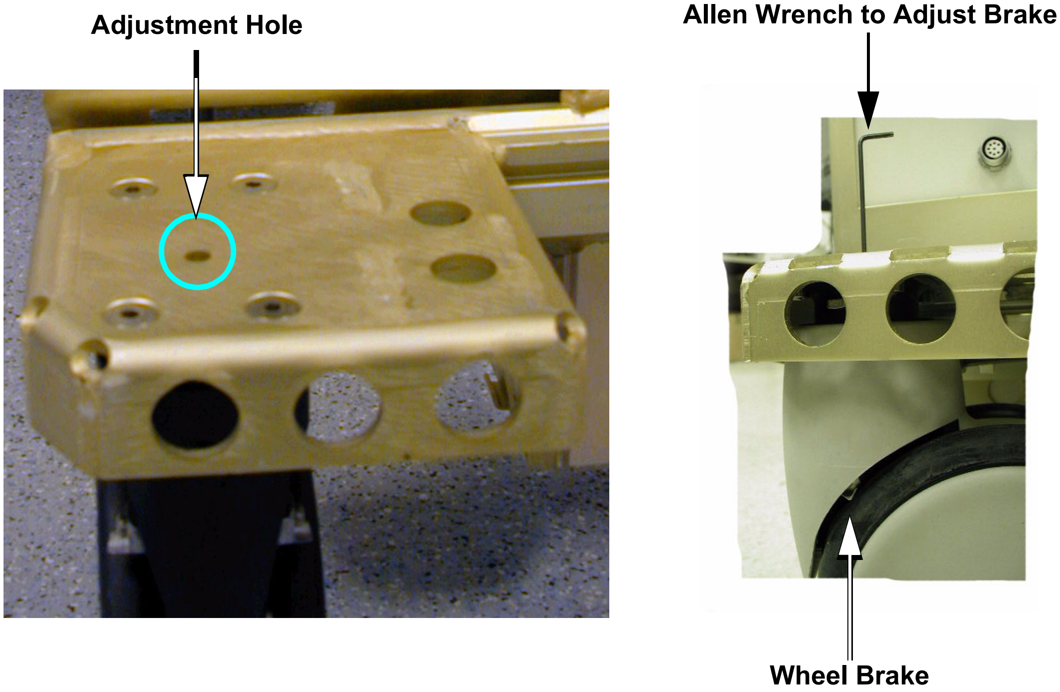


Figure 6-11 Front Brake Adjustment

1.) Refer to Figure 6-11. Use the Allen wrench to add more pressure in order to get more braking action.
2.) If the brakes are too tight, loosen the adjustment with the Allen wrench.
3.) Check the brakes and readjust as necessary before replacing the front bumper.

6-7-2 Rear Wheel Brakes Adjustment

Service adjustment to the rear brakes involves setting the brake so it will properly “bite” the rear tire. The default setting should provide proper braking. If not, follow the procedures below to remove the rear wheel and adjust the brake.

Select the movie camera icon to view the video of the rear brake adjustment procedure.

2 minutes and 57 seconds

WARNING ***Prior to elevating scanner, verify that the floating keyboard is locked in its lowest position. Verify that the front brake is locked and the scanner is unable to swivel. Verify that the rear brakes are in the locked position.***

WARNING ***Use extreme caution when elevating scanner. Elevating scanner will make it unstable which could cause the scanner to tip over.***

6-7-2-1 Tools

Bottle Jack
Allen Wrenches

6-7-2-2 Manpower

One person, 1 hour + travel

6-7-2-3 Preparations (click here to view the cover removal video)

1.) Remove the left- and right-side covers.
2.) Remove the upper rear cover.
3.) Remove the lower rear cover.

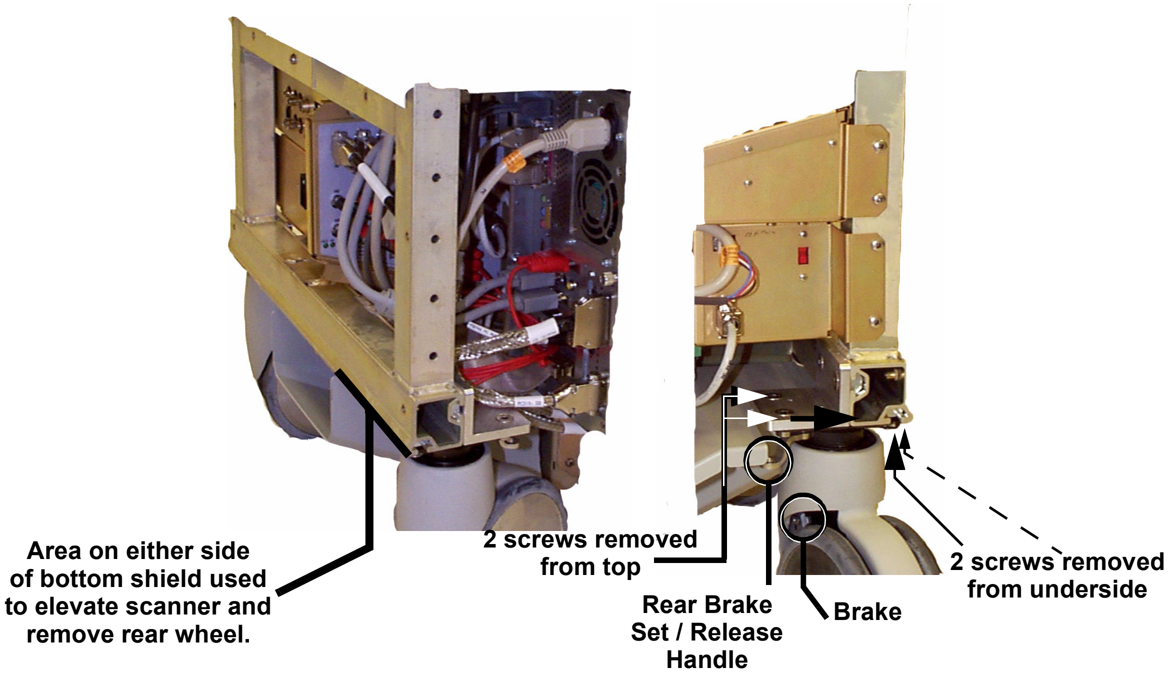

Area on either side of bottom shield used to elevate scanner and remove rear wheel.
2 screws removed from top
Rear Brake Set / Release Handle
Brake
2 screws removed from underside

Figure 6-12 Rear Brake Adjustment

6-7-2-4 Rear Wheel Removal Procedure

4.) Elevate the scanner by placing the bottle jack on the back frame on the side of the bottom shield of the wheel you will be removing. You can also use a block of wood as a lever to raise the scanner and place a second block of wood under the chassis to support the rear wheel off of the ground.
5.) Remove the four screws and remove the wheel from the scanner.
6.) Use an allen wrench to adjust the brake so it will properly “bite” and release the rear tire.

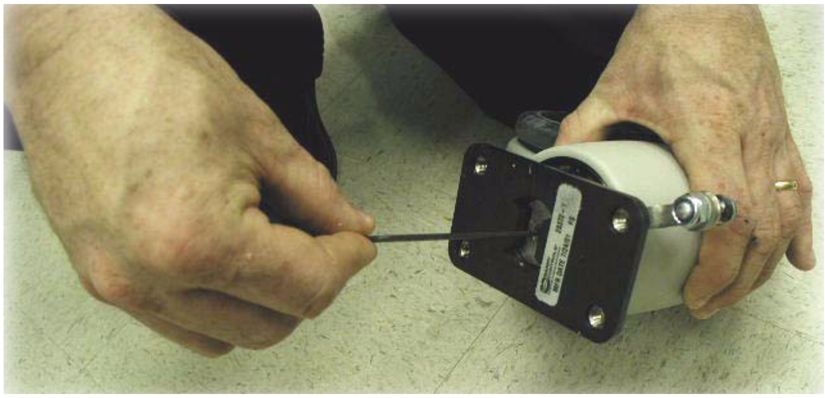


Figure 6-13 Rear Brake Adjustment

6-7-2-5 Rear Wheel Installation Procedure

1.) After adjusting the rear brake, install the rear wheel on the scanner. Hand tighten the four screws.
2.) Carefully lower the scanner and remove the bottle jack.
3.) Tighten the four screws using the weight of the scanner to provide resistance.
4.) Verify brake and scanner operation then replace all covers previously removed.

Chapter 7
Diagnostics/Troubleshooting

Section 7-1
Overview

7-1-1 Purpose of Chapter 7

This section describes how to setup and run the tools and software that help maintain image quality and system operation. Basic host, system, and board level diagnostics are run whenever power is applied. Some Service Tools may be run at the application level.

Table 7-1 Contents in Chapter 7

Section	Description	Page Number
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7-5	Virtual Console Observation	7-8
7-6	Diagnostics	7-13
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Section 7-2
Network Connectivity Troubleshooting

There is a troubleshooting tool available that the customer can use as a first step to investigate network connectivity issues. It gives the current status of network and provides the option to restart the network components in the Back End Processor.

This ALT+N function can also be used to ensure that GE Service is not connected remotely before placing the system in Stand-by Mode. If the syetem is placed in Stand-by Mode with GE Service connected the system will not come out of Stand-by Mode later. The system will have to be power cycled (rebooted).

Activate the tool by pressing ALT+N and follow the choices displayed.

Section 7-3
Gathering Trouble Data

7-3-1 Overview

There may be a time when it would be advantageous to capture trouble images and system data (logs) for acquisition through remote diagnostics (InSite) or to be sent back to the manufacturer for analysis. There are different options to acquire this data that would give different results.

7-3-2 Collect Vital System Information

The following information is necessary in order to properly analyze data or images being reported as a malfunction or being returned to the manufacturer:

- Product Name = LOGIQ™ 9

From the *Utility>System>About* screen:

Applications Software

- Software Version
- Software Part Number

System Base Image Software

- Base Image Revision
- Image Part Number

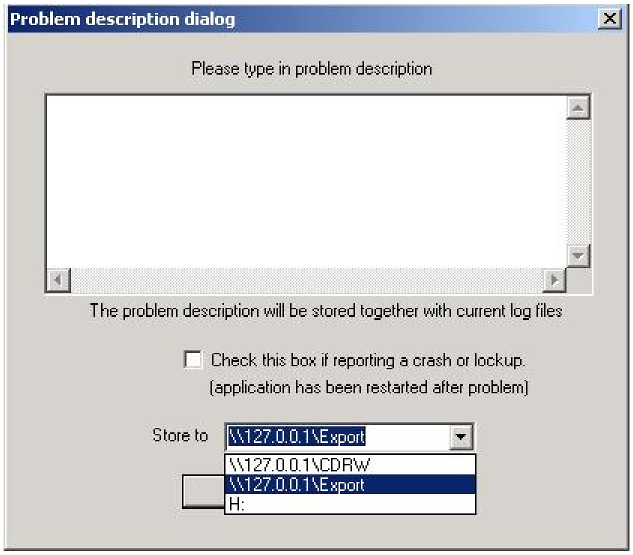
7-3-3 Collect a Trouble Image with Logs

If the system should malfunction, press the Alt-D keys simultaneously. This will collect a screen capture of the image monitor, system presets and the following logs:

- Keyboard Shadow Log
- Error Logs
- Crash Log
- Power Supply
- Temperature

NOTE: *Power Supply and Temperature logs are not currently being updated by the LOGIQ™ 9.*

This Alt-D function is available at all times.



Problem description dialog
Please type in problem description
The problem description will be stored together with current log files
☐ Check this box if reporting a crash or lockup.
(application has been restarted after problem)
Store to
\\127.0.0.1\Export
\\127.0.0.1\CDRW
\\127.0.0.1\Export
H:

Figure 7-1 ALT-D Dialog Box

When Alt-D is pressed, a menu box appears that allows for:

- A place to enter a description of the problem
- A choice to store to a pre-formatted MOD (H: drive), CD-RW or to the *Export* directory D: drive (for remote viewing through InSite).

NOTE: *You **MUST** select H: or CD-RW as the destination device if it is to be different than the default Export directory on the hard drive. Choose the H: drive which is the MOD or the CD-RW.*

The subsequent file is compressed and time stamped. The screen capture is a bitmap which eliminates the possibility of artifacts from compression.

Section 7-4
Screen Captures

There may be times when the customer or field engineer will want to capture a presentation on the screen so it may be recovered by the OnLine Center through InSite. This is accomplished by first saving the image(s) to the clipboard using a Print Key.

The P4 key is the factory default print key to accomplish a secondary screen capture. However, the default is for the video area only or the customer may have customized the P4 Key function. Therefore, screen capture should involve the following steps:

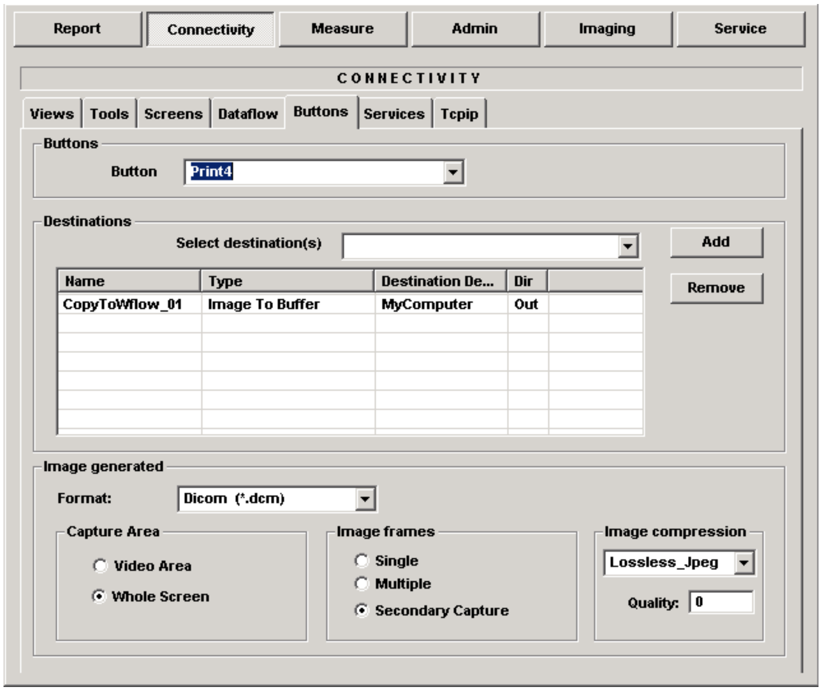
1.) Check and record any custom settings for the Print4 button.
2.) Set the Print4 button to Whole Screen, Secondary Capture.
3.) Capture the required screens to the Hard Drive, MOD or CD-R.
4.) Restore the Print4 button to it's original settings.

7-4-1 Check and Record the P4 Key Function

Check the function of the Print 4 Key in the event that the customer may have made some custom settings.

1.) Select *Utility* from the Touch Panel.
2.) Select *Connectivity* from the Utilities Menu.
3.) Select the *Buttons* tab on the Connectivity screen.
4.) In the *Button* field, select Print4.

The Connectivity/Buttons Screen will be displayed like the one shown in Figure 7-2 on page 7-4 .



Buttons

Button: Print4

Destinations

Select destination(s):

Name	Type	Destination De...	Dir
CopyToWflow_01	Image To Buffer	MyComputer	Out

Image generated

Format: Dicom (*.dcm)

Capture Area
○ Video Area
● Whole Screen

Image frames
○ Single
○ Multiple
● Secondary Capture

Image compression
Lossless_Jpeg
Quality: 0

Figure 7-2 Buttons Set Up Screen

P4 is the factory default Screen Capture Key. If it is not set to Whole Screen or Screen Capture, as shown in Figure 7-2, proceed to step 5 to record the customer's custom settings.

7-4-1Check and Record the P4 Key Function (cont'd)

5.) In the *Destinations* section, record the service that is displayed. The destinations list displays the following information:

* Name: user defined during service configuration

* Type: the type of service

* Server: the device for which the service was configured

* Dir: direction: output, input, or both (I+O)

6.) In the *Image generated* section, record the parameters related to the service.

7-4-2 Setting the P4 Key to Screen Capture

If the P4 Key is not set to screen capture:

1.) While on the Connectivity screen, with the Buttons tab displayed, go to the drop down selection menu in the *Destinations* section.

2.) From the drop down menu select *CopyToWflow_01>Image to Buffer>MyComputer>Out*.

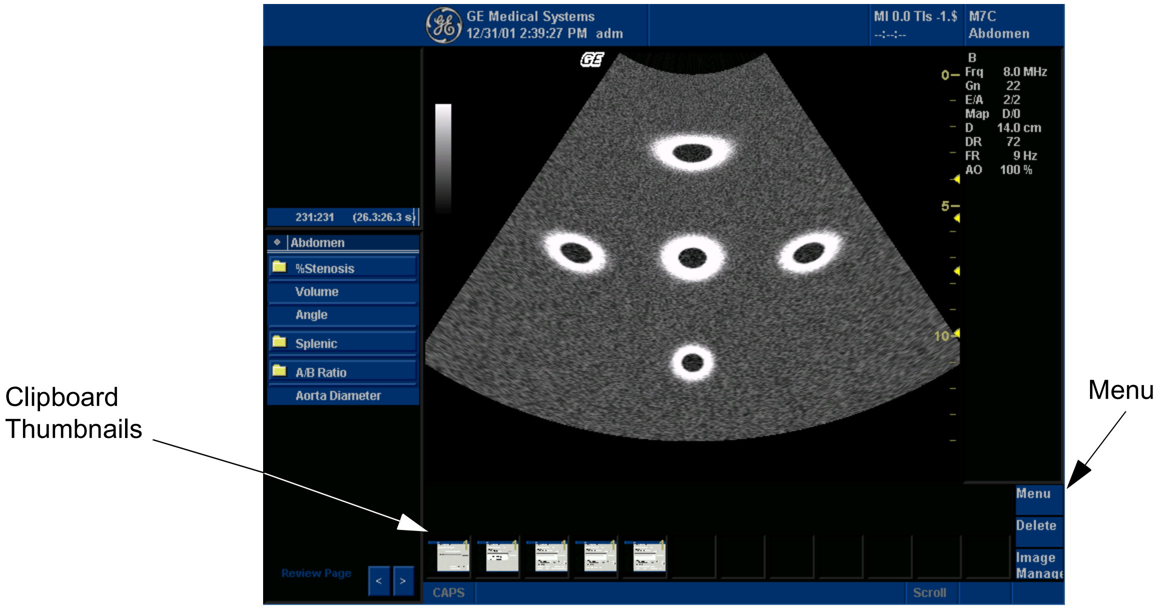
3.) Ensure that the *Image generated* section for capture Area is set to Whole Screen, secondary Capture and No Image Compression.

4.) The P4 Key should now be set up for whole screen capture, sending the screens to the image buffer (clipboard).

7-4-3 Capturing a Screen

The following is a generic process to capture any screen from the scanner:

1.) Navigate to and display the image/screen to be captured.
2.) Press P4. This will place a snapshot of the screen on the “clipboard” displayed at the bottom of the scan image display.



B
Frq 8.0 MHz
Gn 22
E/A 2/2
Map D/0
D 14.0 cm
DR 72
FR 9 Hz
AO 100 %

Figure 7-3 Select Image to Capture

3.) Select SCAN from the touch panel to view the image screen and the snapshots displayed on the bottom.
4.) Highlight the snapshot to be stored to the system hard drive, MOD or CD-R.
5.) Select Menu on the right side of the image screen, then highlight and select SAVE AS.

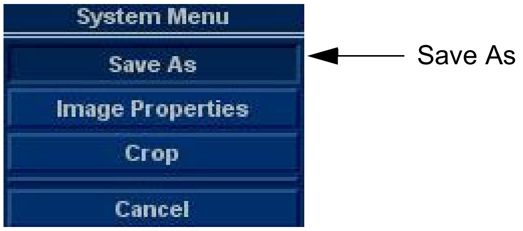
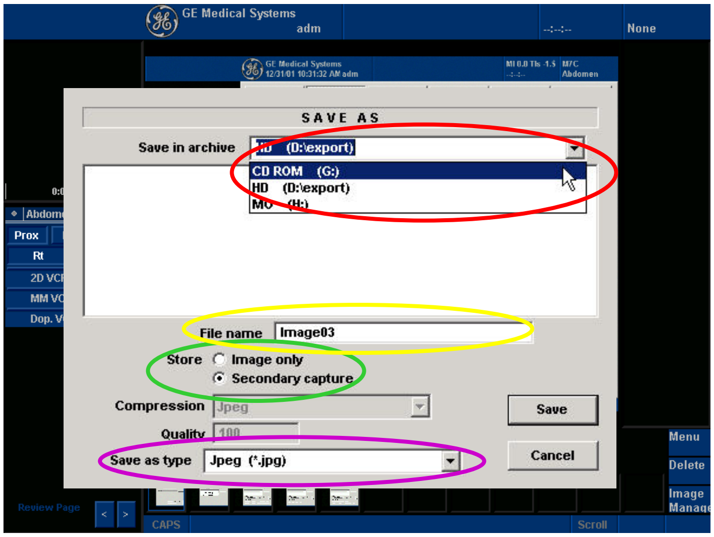


Figure 7-4 Menu > Save As

7-4-3Capturing a Screen (cont'd)



Save in archive: HD (D:\export)
File name: Image03
Store: ○ Image only ● Secondary capture
Compression: Jpeg
Quality: 100
Save as type: Jpeg (*.jpg)

Figure 7-5 Save Dialog Box

6.) A Save dialog box will be opened. Choose *d:\export folder* as the archive location to save the image on the hard disk, MOD or CD-R.

The InSite connection will have access to the export folder on the "D" drive to retrieve these images.

7-4-4 Reset the P4 Key to Customer's Functionality

If the customer had programmed the P4 Key to a function other than screen capture, restore that functionality recorded in Section 7-4-1 on page 7-4. Refer to Figure 7-2.

1.) Select *Utility* from the Touch Panel.
2.) Select *Connectivity* from the Utilities Menu.
3.) Select the *Buttons* tab on the Connectivity screen.
4.) In the *Button* field, select Print4.
5.) In the *Destinations* section, select the service(s) recorded in step 5, Section 7-4-1. The destinations list displays the following information:
    * Name: user defined during service configuration
    * Type: the type of service
    * Server: the device for which the service was configured
    * Dir: direction: output, input, or both (I+O)

NOTE: Only output services can be associated to the print keys.

6.) In the *Image generated* section, select the parameters related to the service recorded in step 6, Section 7-4-1.

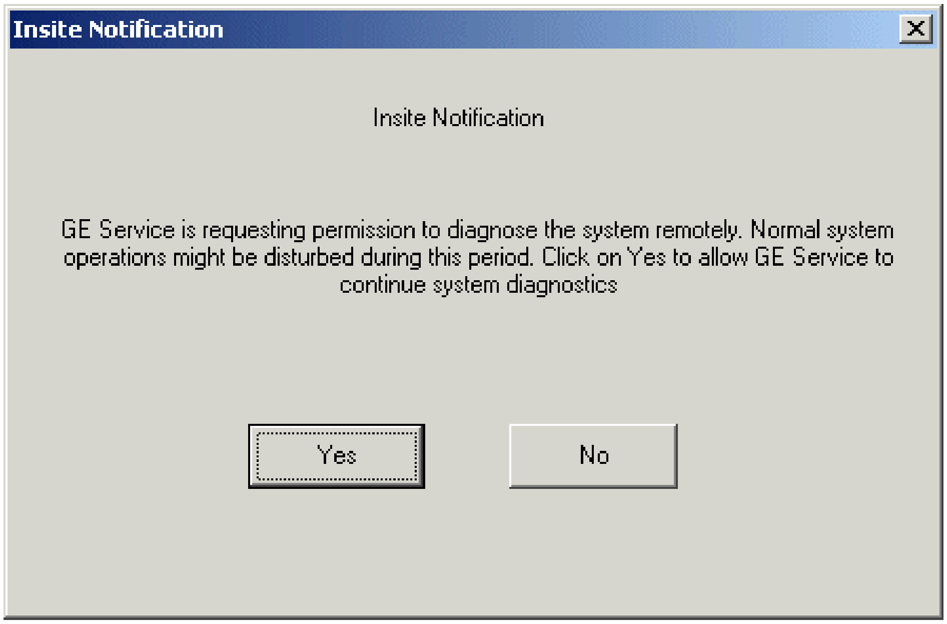
Section 7-5
Virtual Console Observation

7-5-1 General

This tool offers the possibility to view the entire customer's desktop and operation system.

Using the tool a remote service technician or the online center can access and modify all PC settings and programs on the customer's PC.

The customer has to enable this feature by choosing "Disruptive Mode" and confirming "Yes", before a GE Service FE can access the customer’s PC remotely.



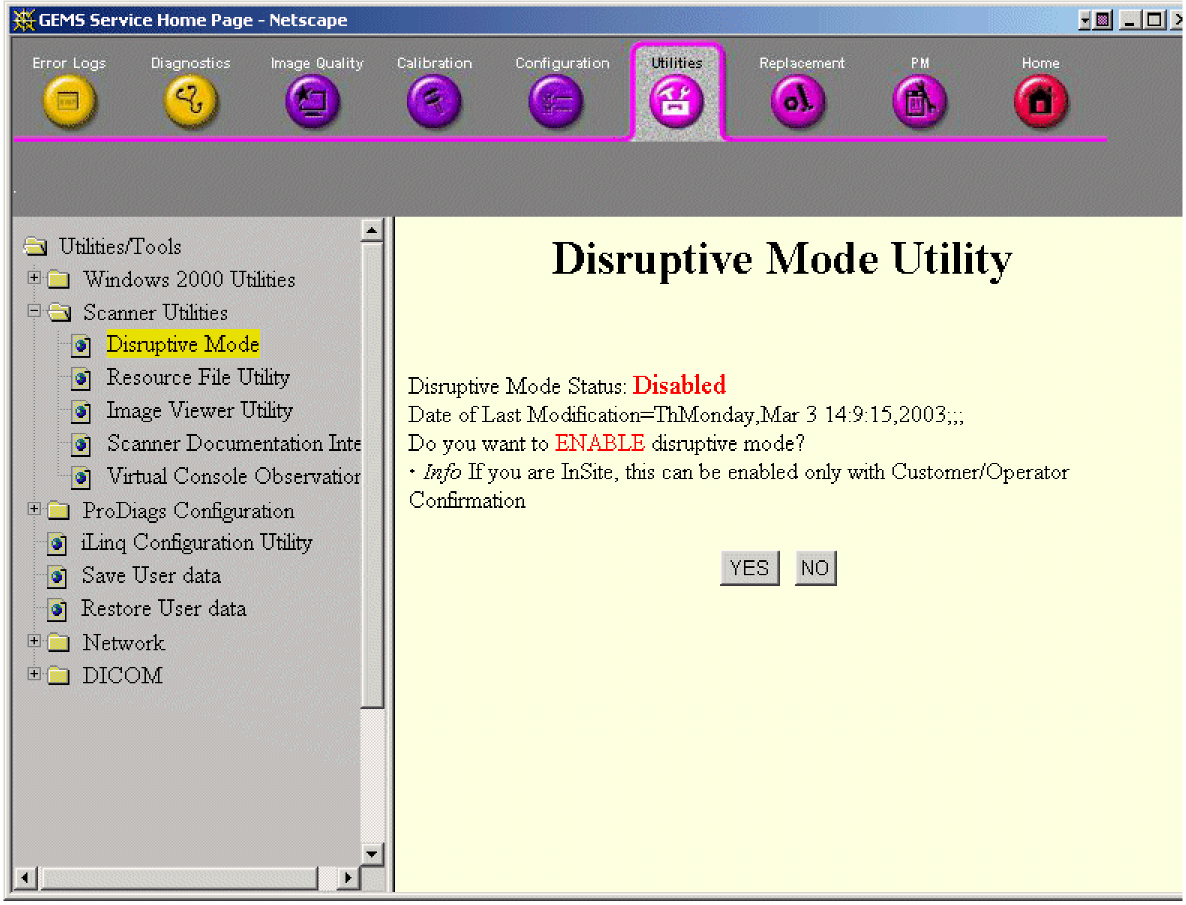
Insite Notification

GE Service is requesting permission to diagnose the system remotely. Normal system operations might be disturbed during this period. Click on Yes to allow GE Service to continue system diagnostics

Figure 7-6 Disruptive Mode

NOTE: *Only GE Service personal has access to this feature. A password is required. All actions and changes should be documented.*

1.) The customer has to enable this feature by choosing “Disruptive Mode” and confirming “Yes”.



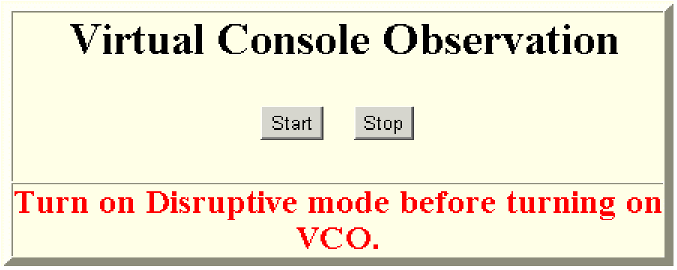
Disruptive Mode Utility

Disruptive Mode Status: Disabled
Date of Last Modification=ThMonday,Mar 3 14:9:15,2003;;;
Do you want to ENABLE disruptive mode?
• *Info* If you are InSite, this can be enabled only with Customer/Operator Confirmation

Figure 7-7 Disruptive Mode

(Customer has to enable "Disruptive Mode")

If the customer has not enabled "Disruptive Mode", a warning is displayed.

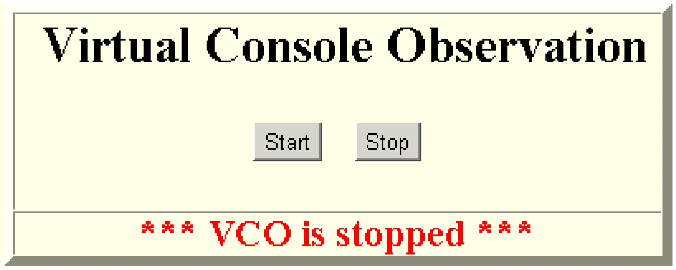


Virtual Console Observation

Turn on Disruptive mode before turning on VCO.

Figure 7-8 Virtual Console Observation "Warning"

2.) After "Disruptive Mode" is enabled by the customer, "Virtual Console Observation" can be activated by selecting the VCO Tool under Scanner Utilities and then press the "Start" button.

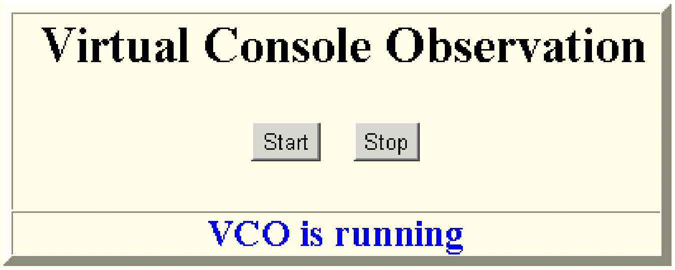


Virtual Console Observation

*** VCO is stopped ***

Figure 7-9 Virtual Console Observation “Activation”

3.) If "Virtual Console Observation" has been activated successfully, the following display is shown to the customer and to the operator:



Virtual Console Observation

VCO is running

Figure 7-10 Virtual Console Observation “Stop”

7.) To terminate "Virtual Console Observation", press the "Stop" button.

7-5-1-1 Use of "Virtual Console Observation"

After Virtual Console Observation is established (see prior section), the PC which should be observed, can be accessed through any browser, i.e."Netscape Navigator" or "MS Internet Explorer".You have to use an open connection or to connect to the customer's PC by entering his TCP/IP address, followed by the port number 5800.

Example:

If the customer has the IP address 1.2.3.4 enter the following string:

http://1.2.3.4:5800/

If the location has been found in the net, the following dialog appears:

Enter the password: *IlinQ01*.

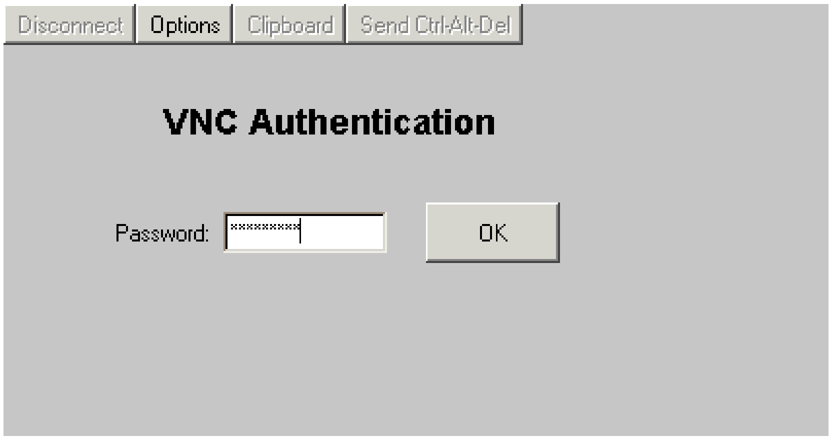
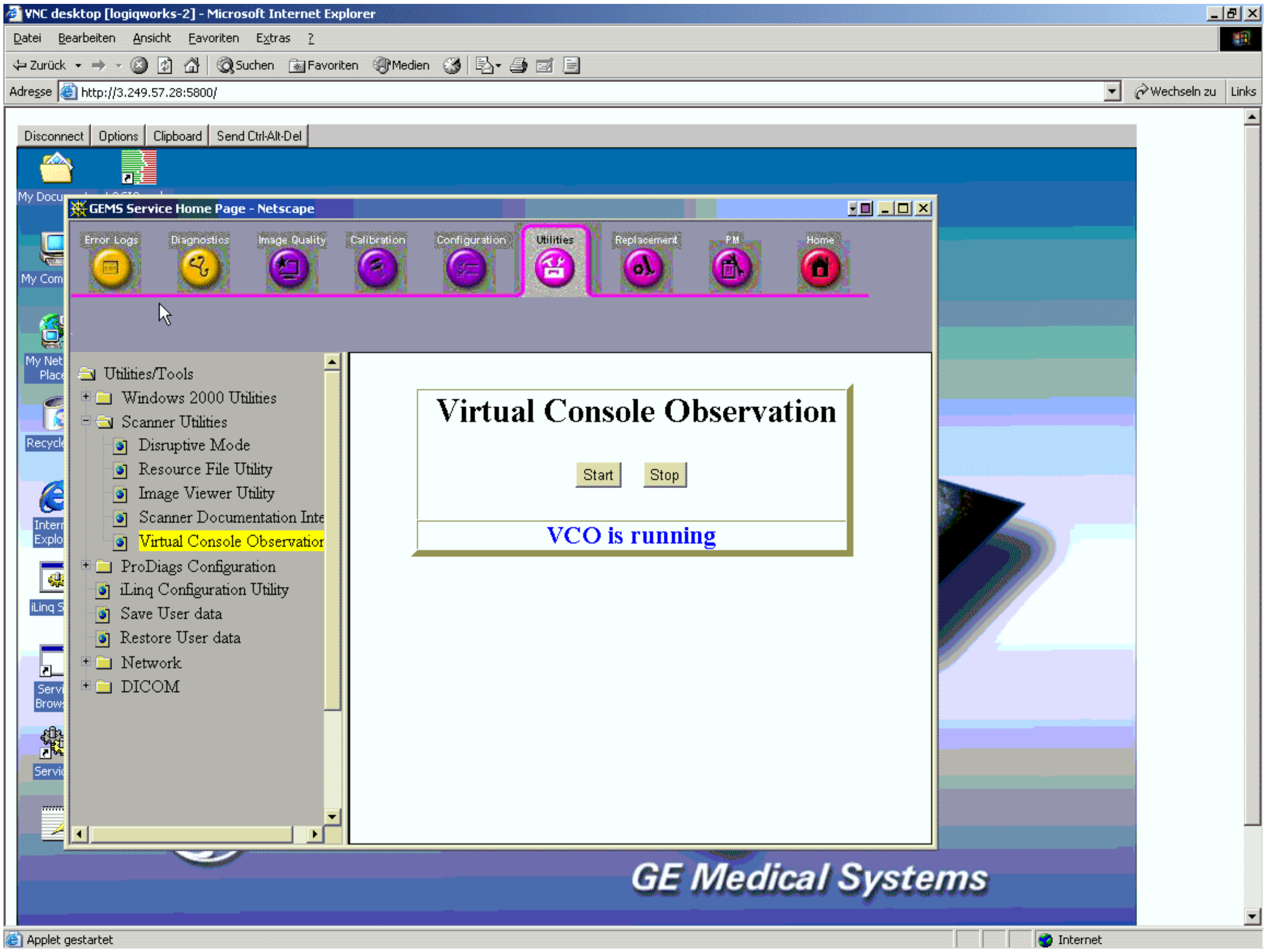


Figure 7-11 VNC Authentication

Within the browser the Service technician can operate on the customer's PC using the mouse and the keyboard.

NOTE: To reduce transmission time the colors are reduced.

7-5-1-1 Use of "Virtual Console Observation" (cont'd)



Virtual Console Observation

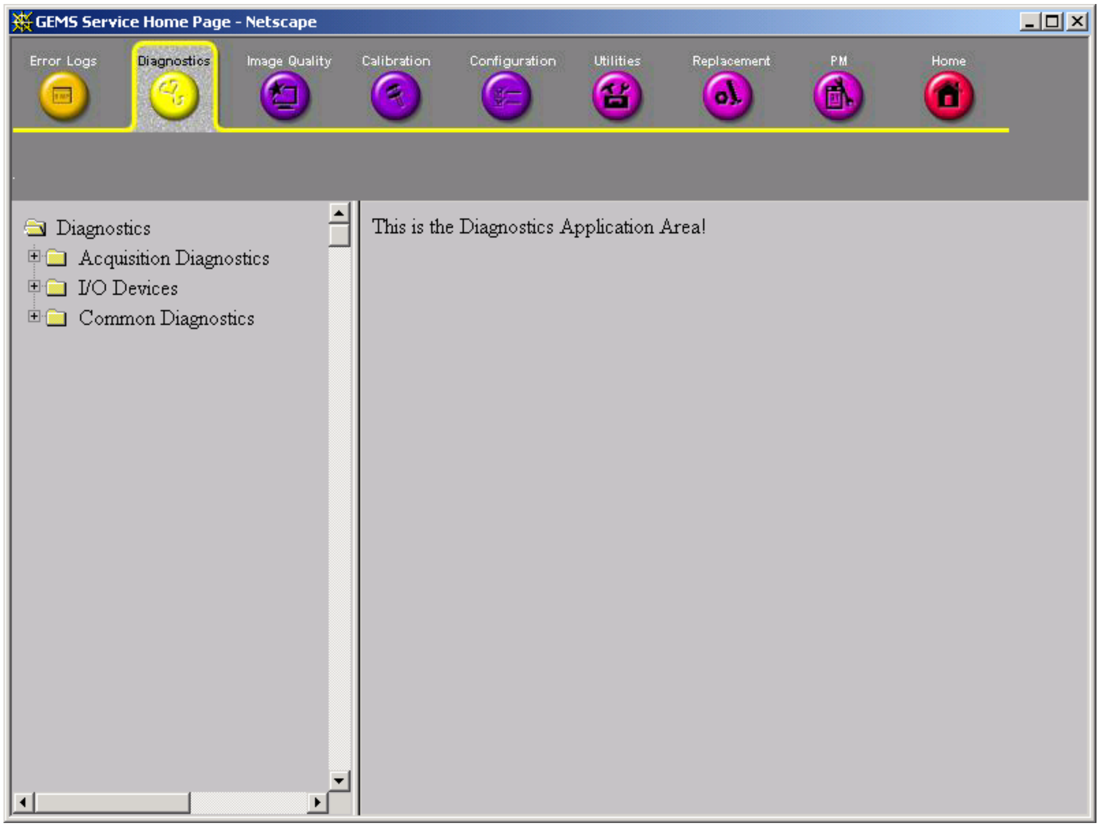
VCO is running

Figure 7-12 Virtual Console Observation

Section 7-6
Diagnostics

As described in **Chapter 5 - Components and Functions (Theory)**, the service platform uses a web-based user interface (UI) to provide access to common service components. A service dongle (part number 066E0703) is required to access areas proprietary to GE.

The Diagnostic home page displays a listing of test categories consisting of Acquisition Diagnostics, I/O Devices and Common Diagnostics. Expand the desired main category to select groups or individual tests.

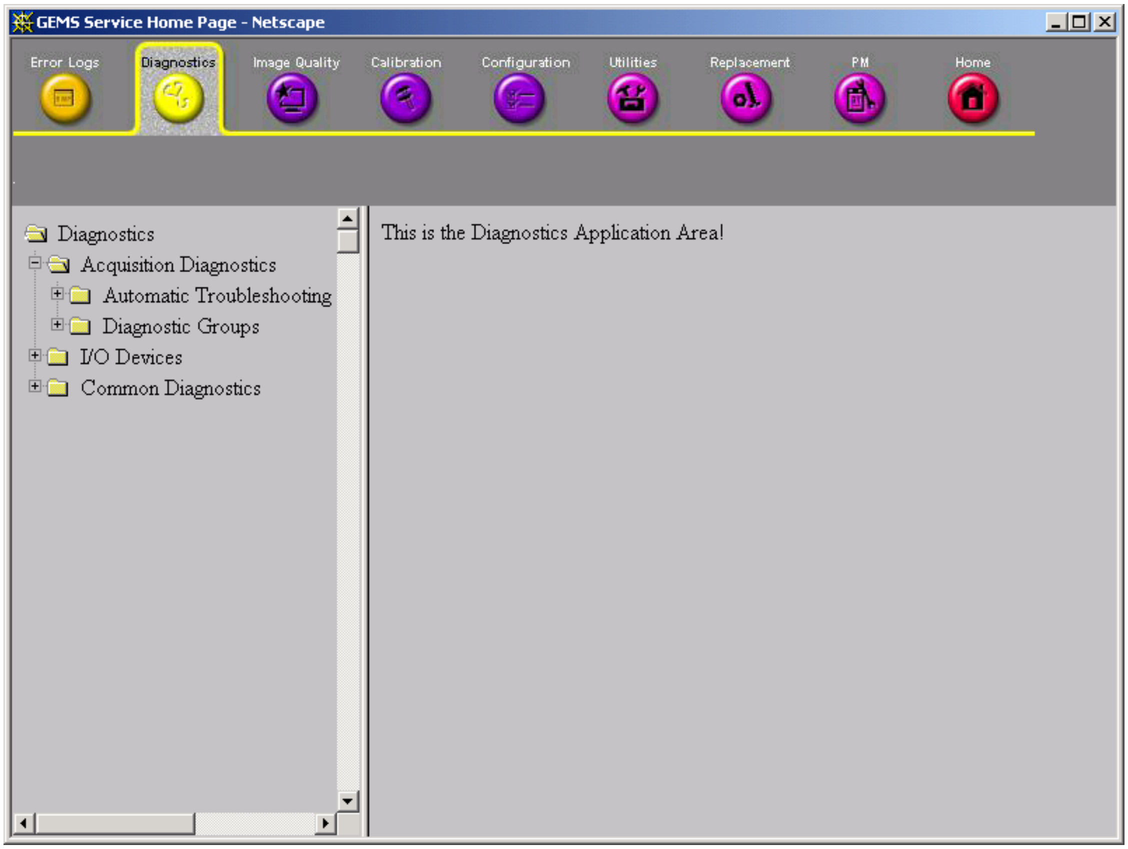


This is the Diagnostics Application Area!

Figure 7-13 Global Service User Interface Diagnostic Screen

Section 7-7
Acquisition Diagnostics

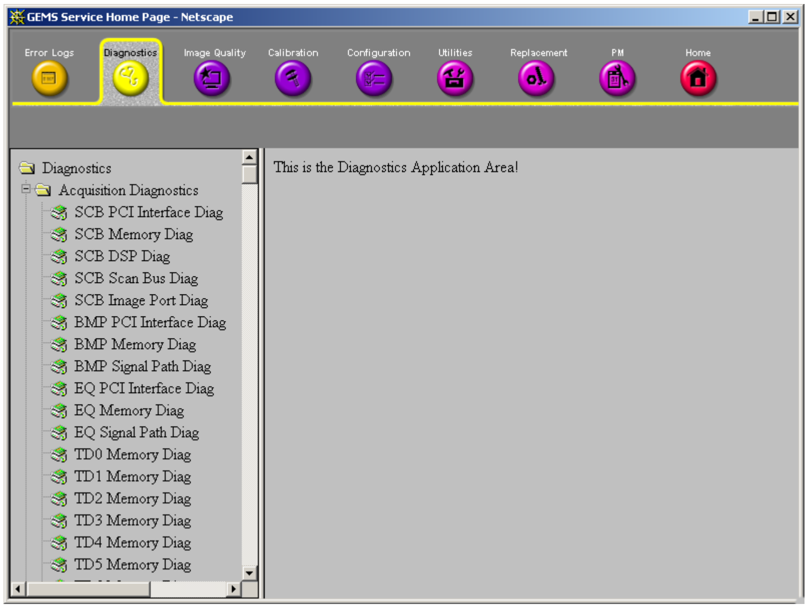
Acquisition Diagnostics is one of three main headings under the GSUI Diagnostics Tab. Figure 7-14 shows the top level menu choices under Acquisition Diagnostics. The subheadings and their respective diagnostic/troubleshooting menu choices are called out and described in the sections that follow.



This is the Diagnostics Application Area!

Figure 7-14   GE Service Acquisition Diagnostic Menu Selections

Section 7-7 Acquisition Diagnostics (cont'd)



This is the Diagnostics Application Area!

Figure 7-15 Customer Acquisition Diagnostics

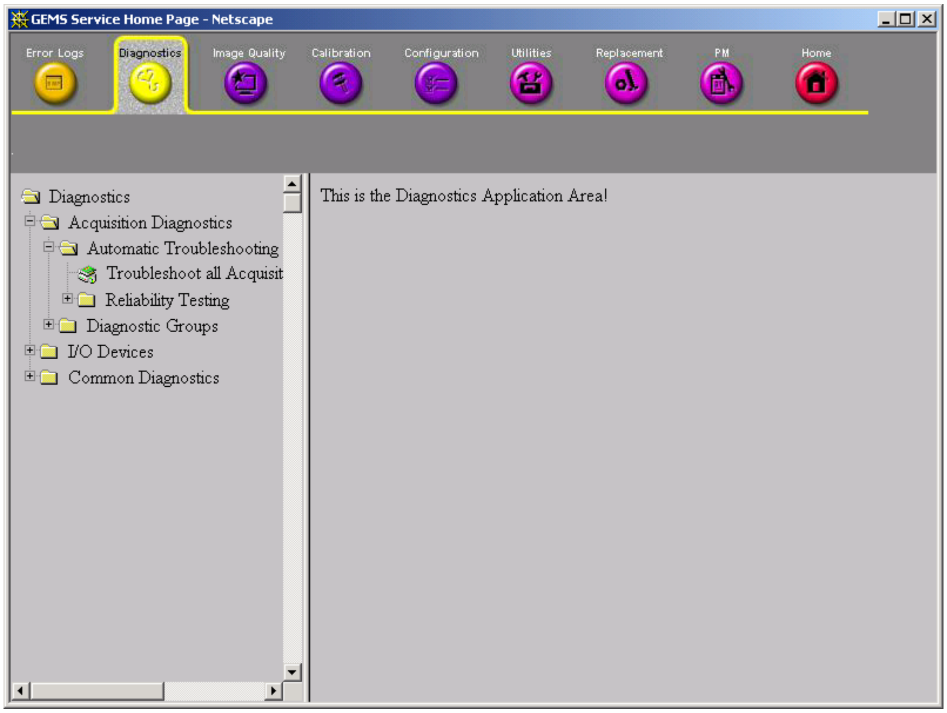
Individual selections run several diagnostics in a *Bottom-up Confidence-Building Order* and return status information identifying any problems. The Acquisition Diagnostic menu is structured as follows:

7-7-1 Automatic Troubleshooting

- Runs all diagnostics and analyzes the results to isolate to the faulty FRU.
- This is the **BEST** way to diagnose a problem with the system.
- Takes less than **6** minutes for all tests to run.
- Disconnect all probes from the scanner before executing the Automatic Troubleshooting sequence.

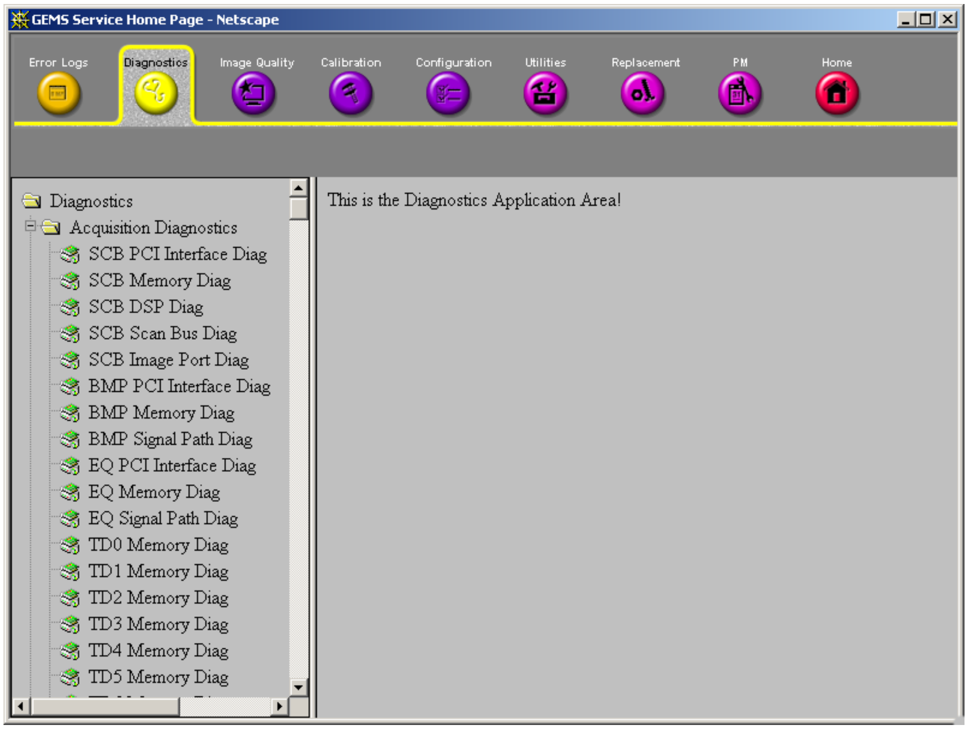
The choices for Automatic Troubleshooting, shown in Figure 7-16 on page 7-16 , allows for running all acquisition diagnostics under the selection Troubleshoot All Acquisition Hardware.

7-7-1Automatic Troubleshooting (cont'd)



This is the Diagnostics Application Area!

Figure 7-16 Automatic Troubleshooting Selections



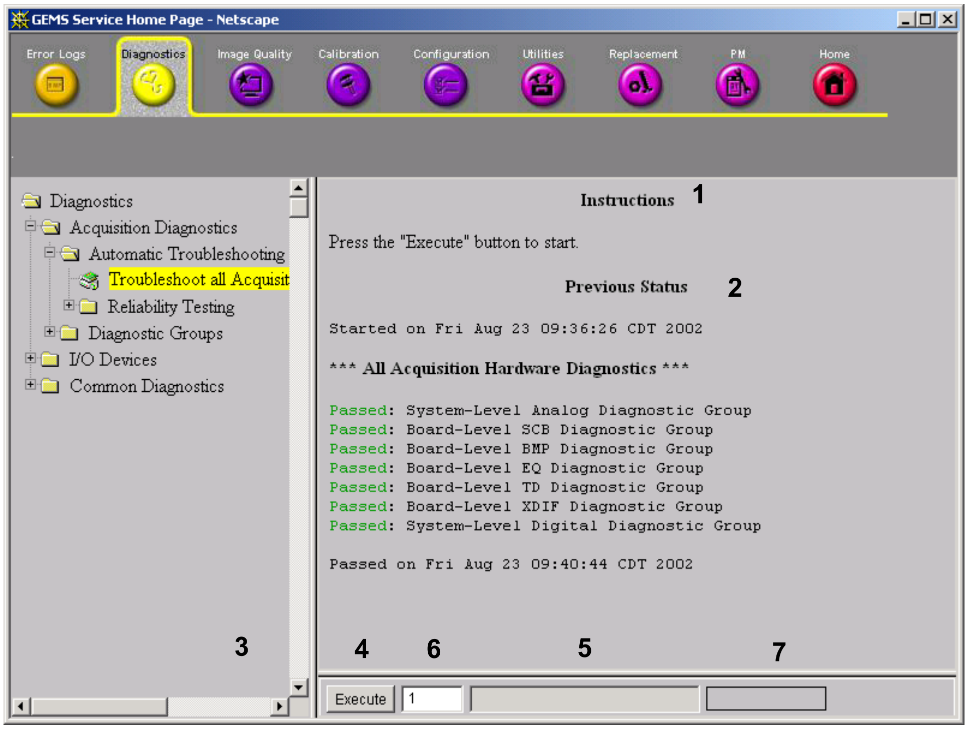
This is the Diagnostics Application Area!

Figure 7-17 User Acquisition Diagnostics

When you select a test to run, like *Troubleshoot all Acquisition Hardware*, the display changes as shown in Figure 7-18 on page 7-18 .

1.) Instructions Frame
  - Displays either a test-specific text or the default instructions.
2.) Status Frame
  - Initially displays the last known status for a selected diagnostic. Once the diagnostic starts, the frame displays the “current” status of all test results.
  - The Status Frame also contains the user interface elements used for Diagnostic Control and Operator Feedback.
3.) Execute Button
  - This switch has two modes - each with appropriate text:
  - Execute - to start the diagnostic
  - Abort - to stop a diagnostic

7-7-1Automatic Troubleshooting (cont'd)



Instructions

Press the "Execute" button to start.

Previous Status

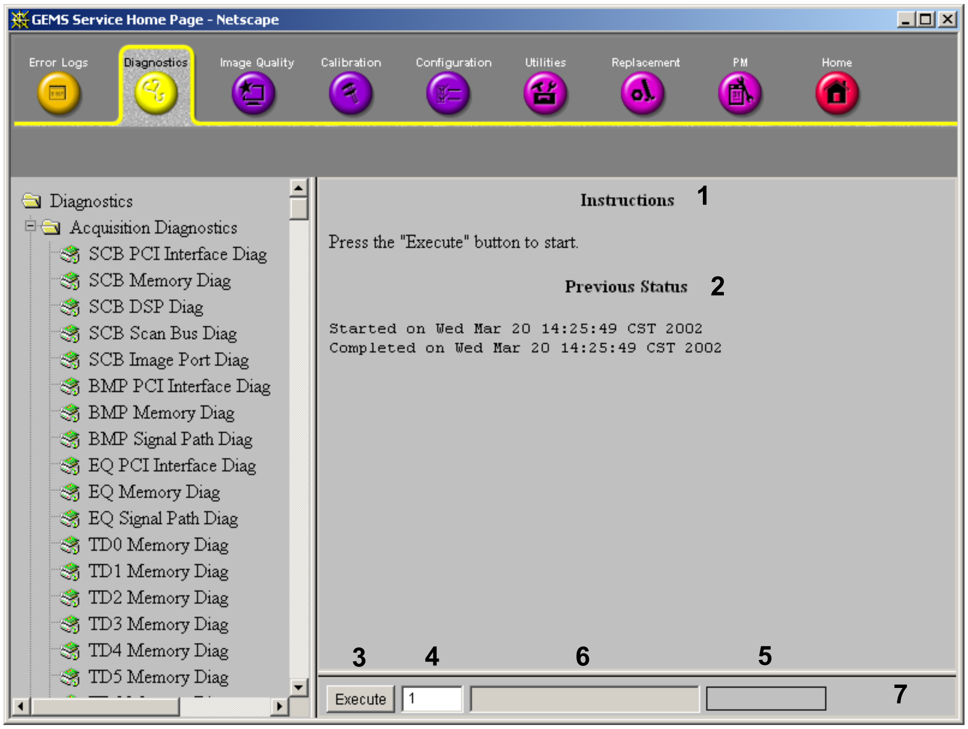
```
Started on Fri Aug 23 09:36:26 CDT 2002

*** All Acquisition Hardware Diagnostics ***

Passed: System-Level Analog Diagnostic Group
Passed: Board-Level SCB Diagnostic Group
Passed: Board-Level BMP Diagnostic Group
Passed: Board-Level EQ Diagnostic Group
Passed: Board-Level TD Diagnostic Group
Passed: Board-Level XDIF Diagnostic Group
Passed: System-Level Digital Diagnostic Group

Passed on Fri Aug 23 09:40:44 CDT 2002
```

Figure 7-18 Automatic Diagnostics Selected



Instructions

Press the "Execute" button to start.

Previous Status

```
Started on Wed Mar 20 14:25:49 CST 2002
Completed on Wed Mar 20 14:25:49 CST 2002
```

Figure 7-19 Diagnostic Selected

4.) Loop Count

- This is an editable text field that will only accept numeric values of 4 digits or less. When the switch is configured as an “execute” switch and pressed, the loop count field will be queried to determine the number of times to execute the diagnostic.

5.) Progress Indicator

- Displays a graphical progress indicator for the user.

6.) Short Text Message

- Displays brief messages about the test’s progress during execution.

7.) Status Frame Background Color

- Initially gray, the Status Frame background color changes upon completion of a diagnostic to indicate completion status.
- Code Status Fail = Red
- Code Status Pass = Green
- Code Status neither Pass nor Fail (Example: Aborted) = Gray (default color).

7-7-2 Reliability Testing

Overnight relialibility test.

- Runs all diagnostics. Logs **ALL** results. Results accumulate in the log each time the tests are run. The log file continues to grow.

NOTE: *This is not intended for field service use. Typically a manufacturing test.*

7-7-3 Diagnostic Listings

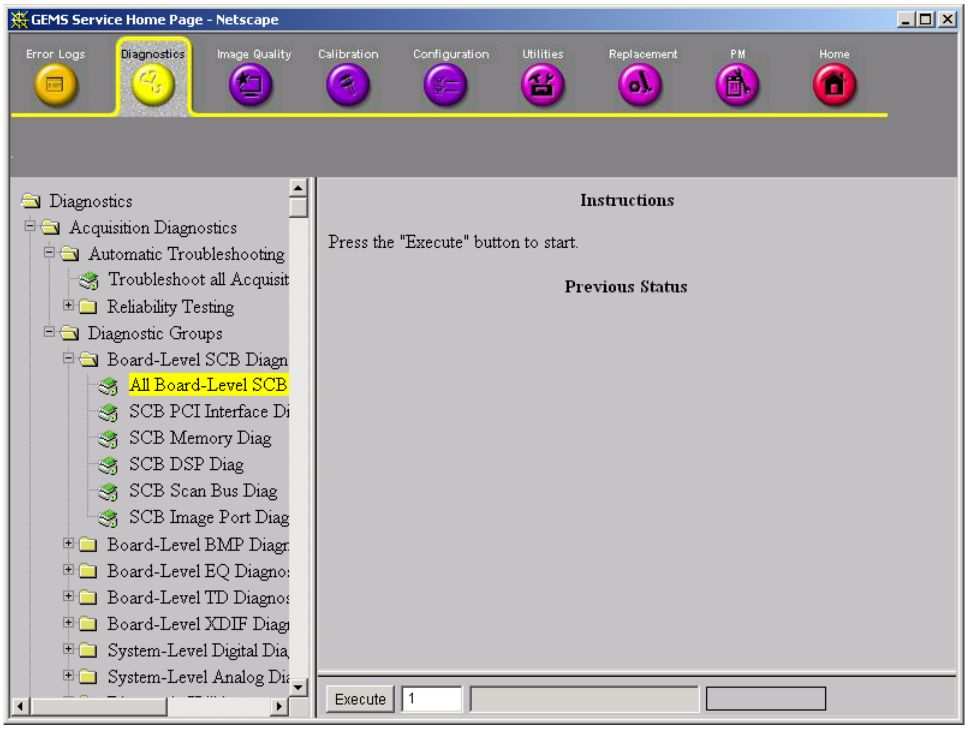
Table 7-2 Acquisition Diagnostics and Utility Listing

Diagnostic/Utility	Function
Troubleshoot All Acquisition Diagnostics	Runs all Acquisition Hardware diagnostics and isolates faults to a FRU.
Overnight Reliability Test	Runs all diagnostics and records a running log.
SCB PCI Interface Diag	Tests the host's ability to communicate with the SCB via the secondary PCI bus
SCB Memory Diag	Tests all of the on-board memory, including registers.
SCB DSP Diag	Tests the Scan Sequencer's DSP and associated components.
SCB Scan Bus Diag	Tests the local Scan Bus and the associated system timing.
SCB Image Port Diag	Tests the Image Port's functionality.
BMP PCI Interface Diag	Tests the host's ability to communicate with the BMP via the PCI bus.
BMP Memory Diag	Tests all of the on-board memory, including registers.
BMP Signal Path Diag	Tests the entire BMP signal path.
EQ PCI Interface Diag	Tests the host's ability to communicate with the registers and memory on the EQ via the PCI bus.
EQ Memory Diag	Tests all of the on-board memory, including registers.
EQ Signal Path Diag	Tests the entire EQ signal path.
TD Memory Diag	Tests all of the on-board memory, for all installed TD boards, including registers.
TD Access Diag	Tests all of the Access Modes utilized for Host/TD communication as well as Channel RAM to Rigel transfers.
XDIF Interface Diag	Tests all of the XDIF functionality that is testable without a probe or probe simulator attached to the system, including the IIC communication.
Comprehensive Signal Path Diag	Tests the signal path of every channel from the TD Rigel Transmitter Memories to the SCB, via both the EQ and the BMP.
TD Analog Reference Diag	Tests the AD_REF and VREF voltages on the TD.
Analog TGC Diag	Tests the generation of the analog TGC voltage.
Power Supply Diag	Tests the system voltages available on the EQ.
Temperature Diag	Tests the temperature of the system, wherever available.
Noise Floor Diag	Measures the noise floor of the system. The noise floor will be calculated form IQ data received without a signal source.
Loopback Diag	Tests the analog front-end of the system.
Acquisition Hardware Information Utility	Writes a file for each Acquisition Hardware FRU containing all Vital Product Data.
Transmit Utility - Start	
Transmit Utility - Change Channel	
Transmit Utility - Stop	
Receive Utility - Single Frame	Receives signal on one channel at a time.
Receive Utility - 8 Frames	
Visual Channel Utility	

Table 7-2 Acquisition Diagnostics and Utility Listing (Continued)

Diagnostic/Utility	Function
High Voltage Reset Utility	Tests whether all TD boards can detect a high voltage fault.
Set VRF Utility	Set the analog VREF to a specified value.
Set TGC Utility	Set the analog TGC to a specified value.
Probe Select Utility	Select a probe connector to be active.
Probe ID Read Utility	Read the Probe ID of all installed probes.
Front-End Calibration Utility	Measures the Front End DC Offset, Gain, and Phase.

7-7-4 Diagnostic Groups



Instructions

Press the "Execute" button to start.

Previous Status

Figure 7-20 Diagnostic Group Selections - SCB Tests

NOTE: *In the simplified block diagrams for the Diagnostic Groups, all unused system components (boards or signals) are ghosted (drawn in gray).*

7-7-4-1 Board-Level SCB Diagnostics

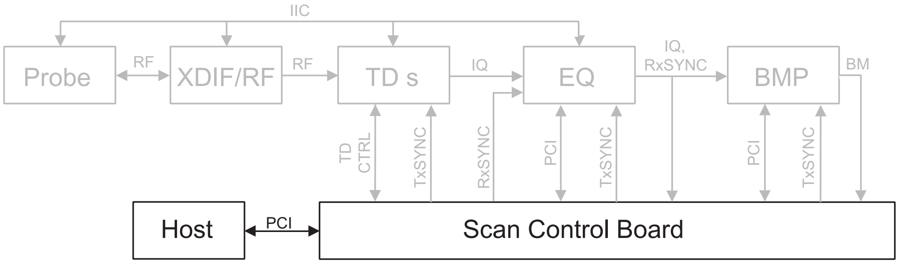


Figure 7-21 Board-Level SCB Block Diagram

- **All Board-Level SCB Diags**: For this board-level Diagnostic Group, the setup simply includes the SCB and the Host.

NOTE: *The basic wellness of the i960 Intelligent I/O processor is tested indirectly via system start-up and the diagnostics listed below.*

7-7-4-1 Board-Level SCB Diagnostics (cont'd)

- **SCB PCI Interface Diag**: Tests the Host's ability to communicate with the SCB via the secondary PCI bus.

NOTE: A preferred test strategy for the PCI 9054 Interface is detailed in Section 7-8.

- **SCB Memory Diag**: Tests all of the on-board memory, including registers. Some on-board RAM requires other functionality (DSP RAM, RxSync RAM). These memories will be tested in their respective function-related diagnostics.
- **SCB DSP Diag**: Tests the following:
  - The Host's communication to the DSP via the Comm Ports.
  - DSP Memory.
  - DSP Processor (Self-Test).
  - DSP Interrupts.
  - DSP LED's.
- **SCB Scan Bus Diag**: Tests the RxSync RAM, and the local on-board Scan Bus. Also, the System Timing block's utilization of the Scan Bus to generate proper TxSync and RxSync pulses is verified in non-CW mode.

NOTE: The backplane Scan Bus is tested at the system level.

- **SCB Image Port Diag**: Tests the following Image Port functionality:
  - The Data and Control Fifos (control lines and data lines).
  - The various components (registers, state machines, i960) and signal lines that transfer data from the Data FIFOs to the Image Memory.
  - The LOGIQ™ 9-to-Pipelink formatting and transfer to Image Memory, including Scan Bus decoding, Image Port state machines, i960, etc.
  - The i960/Video Decoder communication.
  - DMA transfer from the Image Memory to the host.

This diagnostic does not test the SCB's ability to capture I/Q data from the EQ, nor B/M data from the BMP. These functions are tested at the system level.

NOTE: In R3.x software the following error may or may not occur: "Failed SCB DSP Interrupt Test, TxSynce High Time = 00000000". This test is located under the SCB Diagnostics. A 10% failure rate is considered acceptable. You may need to run this test multiple times before considering it a true SCB failure.

7-7-4-2 Board-Level BMP Diagnostics

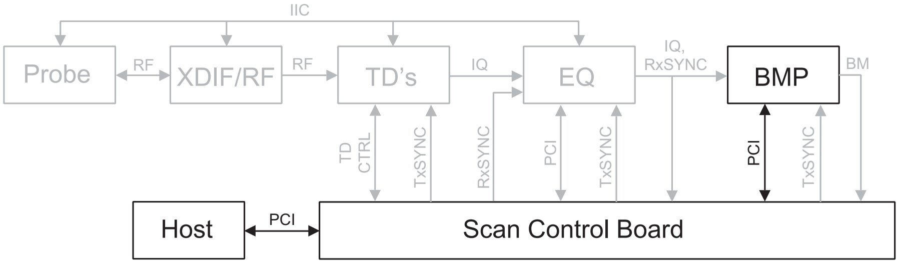


Figure 7-22 Board-Level BMP Block Diagram

- **All Board-Level BMP Diags**: Tests vector generation and Scan Bus emulation on the BMP. This configuration further tests the SCB's Clock Generation and PCI bridge, but does not rely on the Scan Sequencer or Image Port functions of the SCB.

  Not tested on the BMP, with this diagnostic, are its abilities to receive and correctly process the TxSync, RxSync, IQ data, and Scan Bus inputs, as well as its ability to drive the BM output data to the SCB. These functions will be tested with a system-level diagnostic.

  The following subsections outline the Board-Level BMP Diagnostics.

- **BMP PCI Interface Diag**: Tests the Host's ability to communicate with the BMP via the PCI bus.

NOTE: A preferred test strategy for the PCI 9054 Interface is detailed in Section 7-8.

- **BMP Memory Diag**: Tests all of the on-board memory, including registers.

NOTE: Guidelines in Section 7-9 will enumerate the memory locations.

- **BMP Signal Path Diag**: Tests the entire BMP signal path with a series of input vectors and scan parameters (both from the on-board test vector generator), whose results are each read out of a FIFO in the BM Output section of the board.

  The following BMP functions are tested:

  - Synthetic Aperture
  - Axial Interpolator
  - Detector
  - Vector Compounder
  - Rate Converter
  - Dynamic Range Compression
  - Edge Enhance
  - Splicer
  - BM Output, with exception of the output signal drivers
  - Memory Banking

  The BM data read from the Output block's FIFO may then be compared to gold file data for verification and fault isolation.

7-7-4-3 Board-Level EQ Diagnostics

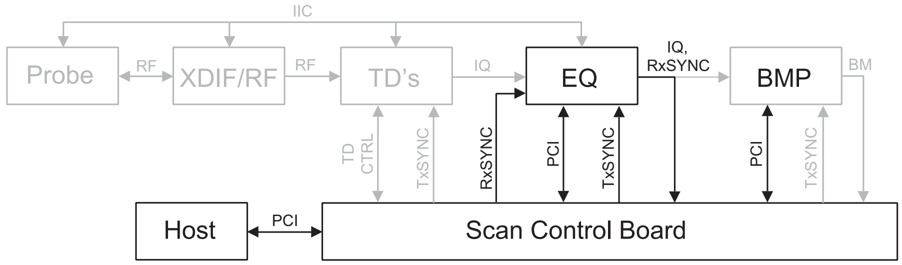


Figure 7-23 Board-Level EQ Block Diagram

- **All Board-Level EQ Diags**: More of the SCB is utilized. Specifically, this diagnostic tests the following SCB functions:
    - PCI Bridge
    - Clock generation
    - Scan Bus generation
    - TxSync generation
    - RxSync generation
    - Image Port

  In terms of EQ functionality, what are not tested with this configuration, are any abilities to communicate with the TD's, XDIF, or RF Amplifier boards. These functions will be tested in other diagnostics.

  The following subsections outline the Board-Level EQ Diagnostics.

- **EQ PCI Interface Diag**: Tests the PCI Interface.

NOTE: A preferred test strategy for the PCI 9054 Interface is detailed in Section 7-8.

- **EQ Memory Diag**: Tests all of the on-board memory, including registers.

NOTE: Guidelines in Section 7-9 will enumerate the memory locations.

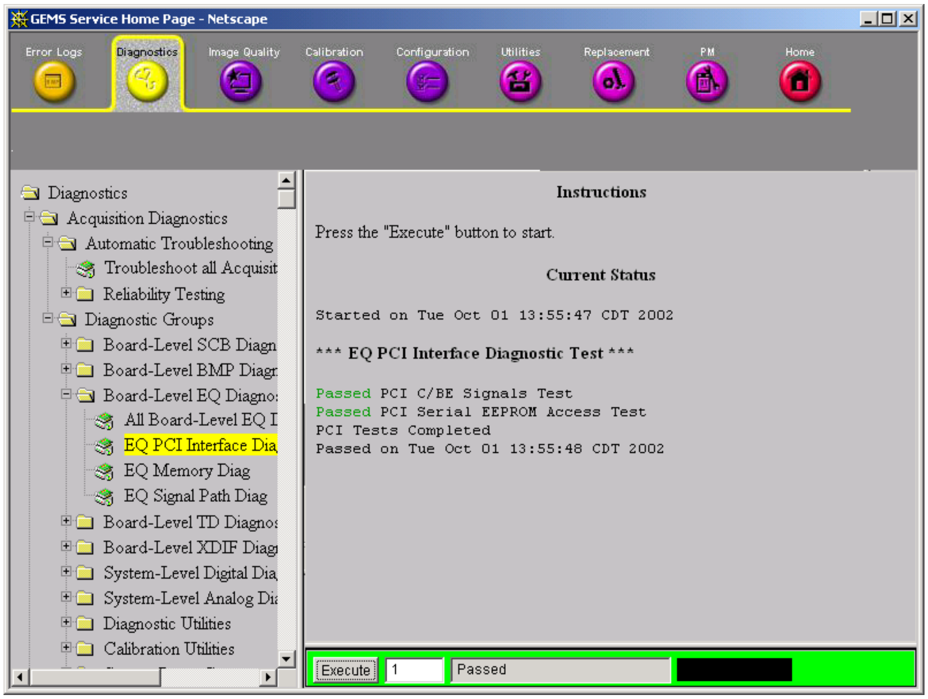
7-7-4-3 Board-Level EQ Diagnostics (cont'd)

- **EQ Signal Path Diag**: Tests the entire EQ data path, in all it's modes and available options. This diagnostic will utilize the TGC RAM in conjunction with a constant value loaded into the Input Barrel Shifter. Scans will then be run, under the control of the SCB. In this way, the TGC section of the board can both be tested and also made to form test vectors for the rest of the signal chain.

  Specifically, the following functions are tested:

  - TGC generation and analog/digital apportioning
  - Scan Bus Interface
  - Output Drivers
  - Signal Chain, including:
    - Input Barrel Shifter and Multiplier (digital TGC)
    - NCOM and FIR (TFC)
    - Output Barrel Shifter

  Processed IQ data out of the EQ and input to the SCB may then be read from the Image Port's Ring Buffer and compared to gold file data for verification and fault isolation.



Instructions

Press the "Execute" button to start.

Current Status

```
Started on Tue Oct 01 13:55:47 CDT 2002

*** EQ PCI Interface Diagnostic Test ***

Passed PCI C/BE Signals Test
Passed PCI Serial EEPROM Access Test
PCI Tests Completed
Passed on Tue Oct 01 13:55:48 CDT 2002
```

Figure 7-24 Example: EQ Board PCI Test Passed

7-7-4-4 Board Level EBM Diagnostics

BT'02 Systems and higher contain the EBM Board than combines the functions of the previous EQ4 and BMP4 boards.

The BMP diagnostics previously mentioned will test the BMP portion of the EBM board and the EQ diagnostics will check the EQ portion of the EBM board.

7-7-4-5 Board-Level TD Diagnostics

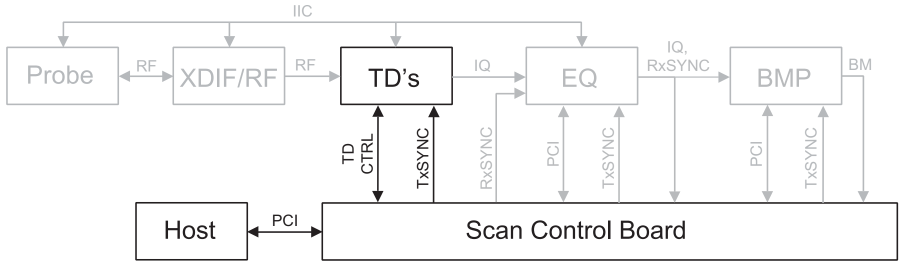


Figure 7-25 Board-Level TD Block Diagram

- **All Board-Level TD Diags**: This configuration, again, tests the SCB's Clock Generation and PCI Bridge. Additionally, the TD access functionality is more fully tested, building on the SCB's board-level tests.

  The following subsections outline the Board-Level TD Diagnostics.

- **TD Memory Diag**: This diagnostic shall test all of the on-board memory, for all installed TD boards, including registers.

NOTE: Guidelines in Section 7-9 will enumerate the memory locations.

- **TD Access Diag**: Tests all of the Access Modes utilized for Host/TD communication, as well as Channel RAM to Rigel transfers.

  This diagnostic includes single-location accesses, single-board broadcasts, and multiple-board broadcasts. The diagnostic will adjust its parameters depending upon how many TD boards are installed in the system.

7-7-4-6 Board-Level XDIF Diagnostics

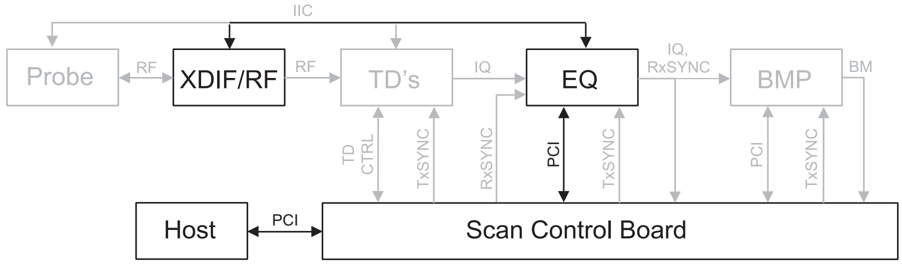


Figure 7-26 Board-Level XDIF Block Diagram

- **All Board-Level XDIF Diags**: Targets the XDIF. The system setup required for this Diagnostic Group is shown in Figure 7-26.
- This Diagnostic Group consists of a single diagnostic, outlined in the following subsection.
- **XDIF Interface Diag**: Tests the non-probe generated communication between the EQ and the XDIF.

  This diagnostic shall test all of the XDIF functionality that is testable without a probe or probe simulator attached to the system, including the IIC communication.

7-7-4-7 System-Level Digital Diagnostics

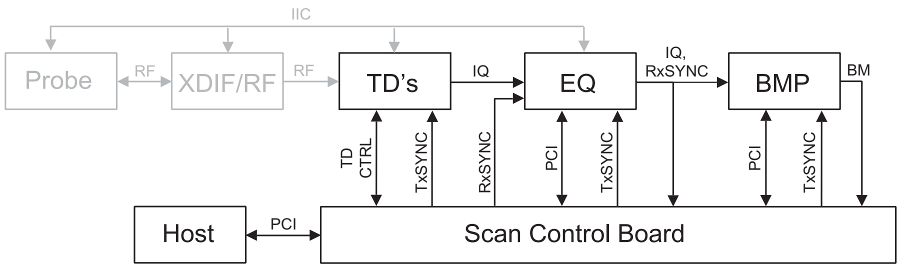


Figure 7-27 System-Level TD-EQ-BMP-SCB Block Diagram

- **All System-Level Digital Diags**: Targets system communications and digital system functions (those functions which rely on multiple boards for performance, but do not target analog circuitry).
- **TD Access Diag**: Tests all of the Access Modes utilized for Host/TD communication, as well as Channel RAM to Rigel transfers.

  This diagnostic includes single-location accesses, single-board broadcasts, and multiple-board broadcasts. The diagnostic will adjust its parameters depending upon how many TD boards are installed in the system.

- **Comprehensive Signal Path Diag**: Tests the signal path of every channel from the TD Rigel Transmit Memories to the SCB, via both the EQ and BMP.

  This Diagnostic puts the entire digital signal processing path together for the most comprehensive digital data path test available to the system. The system setup for this Diagnostic is shown in Figure 7-27. This diagnostic tests the following functions:

  - TD signal paths.
  - TD - EQ data communication.
  - EQ - BMP data communication.
  - EQ - SCB data communication.
  - BMP - SCB data communication.
  - SCB's ability to simultaneously receive and process I/Q and BM data.

  This diagnostic will need to verify each receive channel by itself, and also all receive channels at once (to test the summing and the upper bits of the data path).

7-7-4-8 System-Level Analog Diagnostics

- **All System-Level Analog Diags**: These tests may involve the entire system or, in some cases, only a few circuit boards.

  Diagnostics which may utilize the entire system are those which test various analog aspects of the system, such as noise floor tests, loopback tests, etc.

  Diagnostics which may only utilize a few circuit boards are those which test various miscellaneous functions, such as Analog TGC generation on the RF Amplifier board.

  These tests should be performed last in the confidence-building scheme. However, the order in which they are performed, relative to each other is not important.

- **TD Analog Reference Diag**: Tests the generation of the two reference voltages required on each TD board (AD_REF and VREF), and the IIC bus communication to the TD boards through the EQ.

  AD_REF is simply the output of an analog reference device on each TD, while VREF is generated on each board based on a digital value output from the EQ (this also tests some EQ functionality missed in its board-level diagnostic). Each is measured using an IIC-connected A/D converter on the TD.

  The system setup required for this test is shown in Figure 7-28.

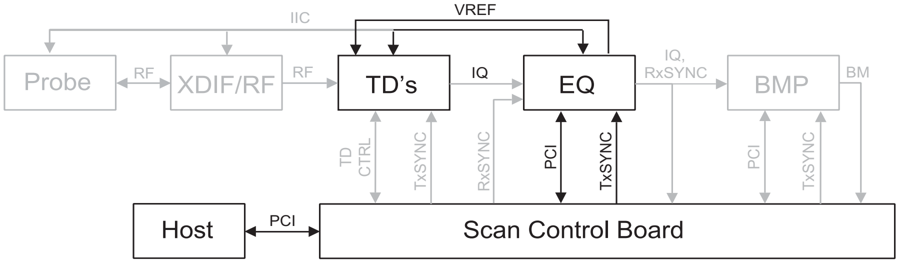


Figure 7-28 System-Level TD Analog Reference Block Diagram

- **Analog TGC Diag**: Tests the generation of the analog TGC voltage.

  The analog TGC and IIC bus communication to the RF Amplifier board, through the EQ is tested. The RF Amplifier functionality tested includes:

  - Analog TGC digital communication with EQ (this also tests some EQ functionality missed in its board-level diagnostic) and analog TGC Gain Reference generation, through the DAC
  - RF Amplifier on-board IIC functionality

  The system setup required for this test is shown in Figure 7-29.

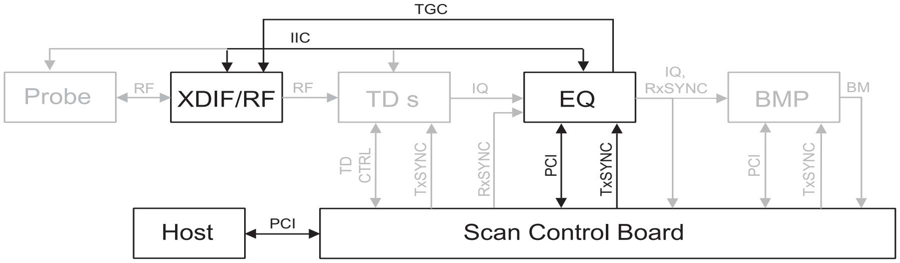


Figure 7-29 Analog TGC System Setup Block Diagram

7-7-4-8System-Level Analog Diagnostics (cont'd)

- **Power Supply Diag**: Tests the System voltages available on the EQ. This diagnostic tests the following:
  - Power supply voltage rail generation.
  - Voltage rail loading by installed circuit boards (insomuch as there are no faults on these)
  - Pulser HV Level Select functionality, base on the Scan Bus tag
  - IIC functionality on the EQ.

  The system's voltage rails are read from IIC-connected A/D converters on the EQ.

  The system setup required for this test is shown in Figure 7-30.

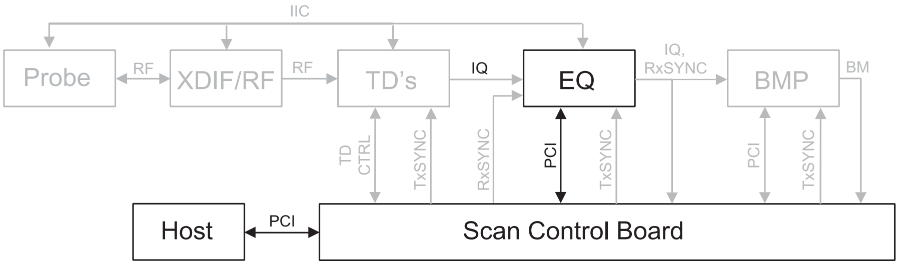


Figure 7-30 Power Supply System Setup Block Diagram

- **Temperature Diag**: Tests the temperature of the system, wherever available.

  This test will utilize the temperature sensing ability built into the IIC-connected A/D converters on the TD, RF Amplifier, and EQ. These are the same A/D converters utilized in the Analog Reference Diagnostic, Power Supply Diagnostic, and Analog TGC Diagnostic. Also, the probe temperature sensing ability is tested.

  The system setup required for this test is shown in Figure 7-31.

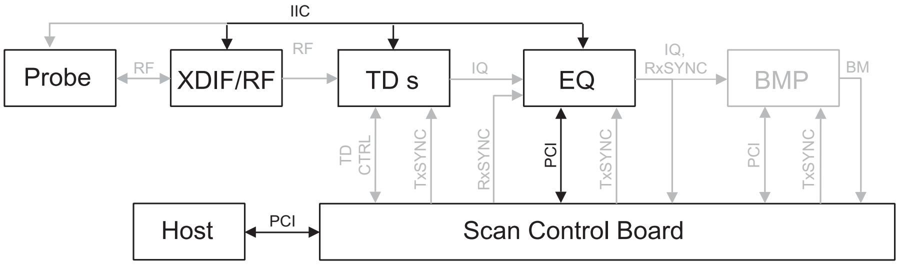
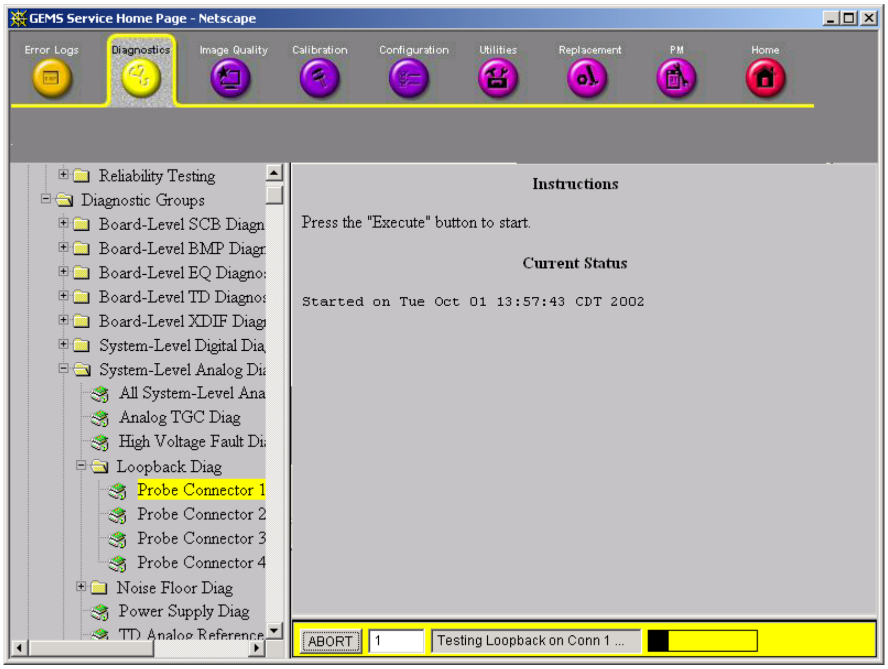


Figure 7-31 Probe Temperature Monitoring System Setup Block Diagram

- **Noise Floor Diag**: Measures the noise floor of the System.

  The entire system is required for this diagnostic. The noise floor will be calculated from IQ data received without a signal source.

7-7-4-8 System-Level Analog Diagnostics (cont'd)



Instructions

Press the "Execute" button to start.

Current Status

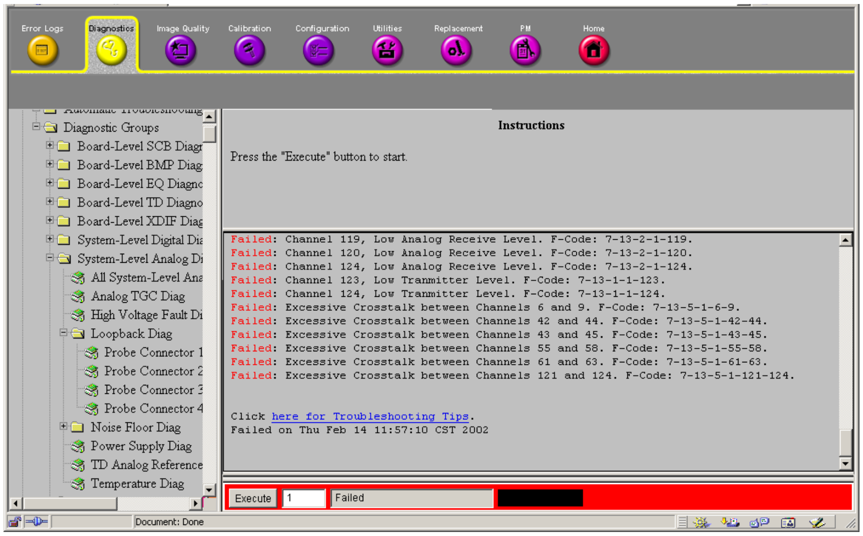
```
Started on Tue Oct 01 13:57:43 CDT 2002
```

1 | Testing Loopback on Conn 1 ...

Figure 7-32 Example: Running Loopback Tests

- **Loopback Diag**: Tests the analog front end of the System.

  This test utilizes the transmitter of one or more channels to generate a looped-back analog input signal for the receiver of each channel. The entire system is required for this diagnostic. With this setup (given a known-good digital signal path), analog front end component failures can be isolated.



Instructions

Press the "Execute" button to start.

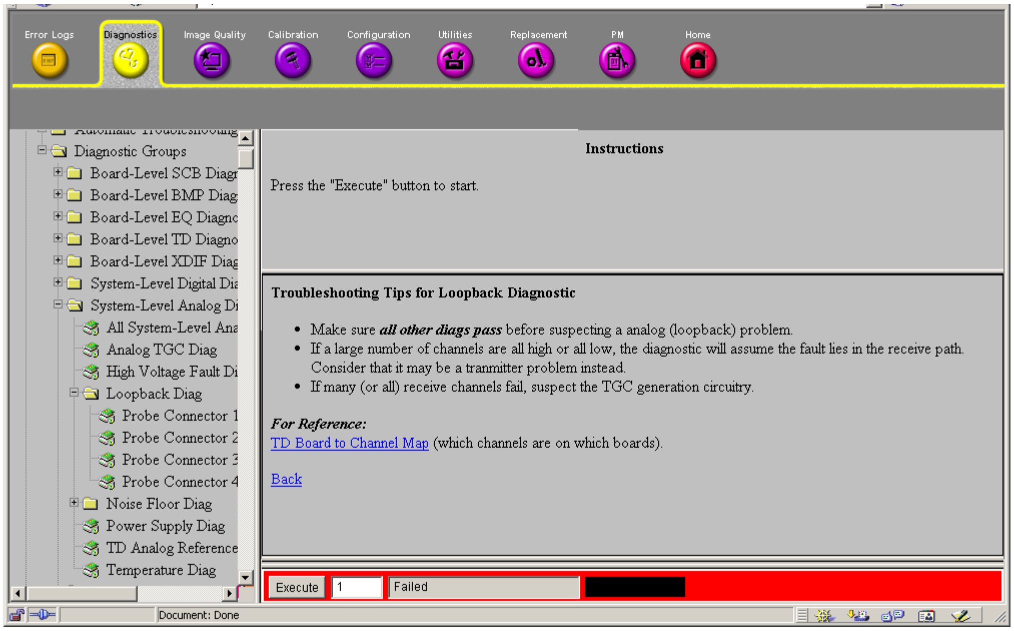
```
Failed: Channel 119, Low Analog Receive Level. F-Code: 7-13-2-1-119.
Failed: Channel 120, Low Analog Receive Level. F-Code: 7-13-2-1-120.
Failed: Channel 124, Low Analog Receive Level. F-Code: 7-13-2-1-124.
Failed: Channel 123, Low Tranmitter Level. F-Code: 7-13-1-1-123.
Failed: Channel 124, Low Tranmitter Level. F-Code: 7-13-1-1-124.
Failed: Excessive Crosstalk between Channels 6 and 9. F-Code: 7-13-5-1-6-9.
Failed: Excessive Crosstalk between Channels 42 and 44. F-Code: 7-13-5-1-42-44.
Failed: Excessive Crosstalk between Channels 43 and 45. F-Code: 7-13-5-1-43-45.
Failed: Excessive Crosstalk between Channels 55 and 58. F-Code: 7-13-5-1-55-58.
Failed: Excessive Crosstalk between Channels 61 and 63. F-Code: 7-13-5-1-61-63.
Failed: Excessive Crosstalk between Channels 121 and 124. F-Code: 7-13-5-1-121-124.


Click here for Troubleshooting Tips.
Failed on Thu Feb 14 11:57:10 CST 2002
```

1 | Failed

Figure 7-33 Example: Loopback Test Failure

7-7-4-8 System-Level Analog Diagnostics (cont'd)



Instructions

Press the "Execute" button to start.

Troubleshooting Tips for Loopback Diagnostic

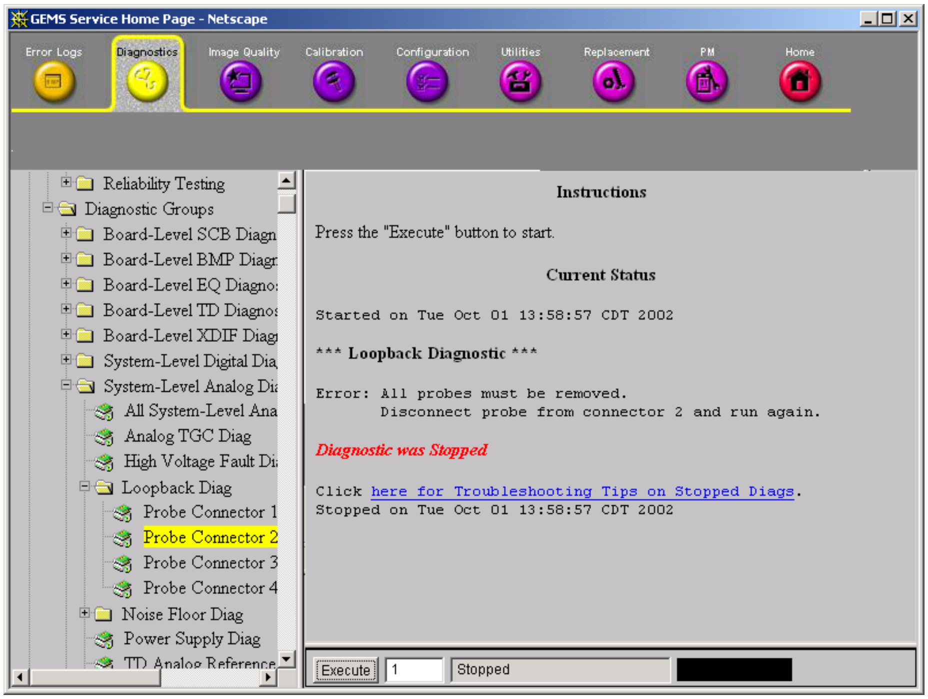
- Make sure ***all other diags pass*** before suspecting a analog (loopback) problem.
- If a large number of channels are all high or all low, the diagnostic will assume the fault lies in the receive path. Consider that it may be a tranmitter problem instead.
- If many (or all) receive channels fail, suspect the TGC generation circuitry.

For Reference:
TD Board to Channel Map (which channels are on which boards).

Back

1 Failed

Figure 7-34 Example: Loopback Troubleshooting Hints



Instructions

Press the "Execute" button to start.

Current Status

```
Started on Tue Oct 01 13:58:57 CDT 2002

*** Loopback Diagnostic ***

Error: All probes must be removed.
       Disconnect probe from connector 2 and run again.
```

Diagnostic was Stopped

```
Click here for Troubleshooting Tips on Stopped Diags.
Stopped on Tue Oct 01 13:58:57 CDT 2002
```

1 Stopped

Figure 7-35 Example Loopback Test with Probe Attached

7-7-4-9 Diagnostic Utilities

This Diagnostic Group contains useful utilities, which provide either a diagnostic or calibration tool for the user.

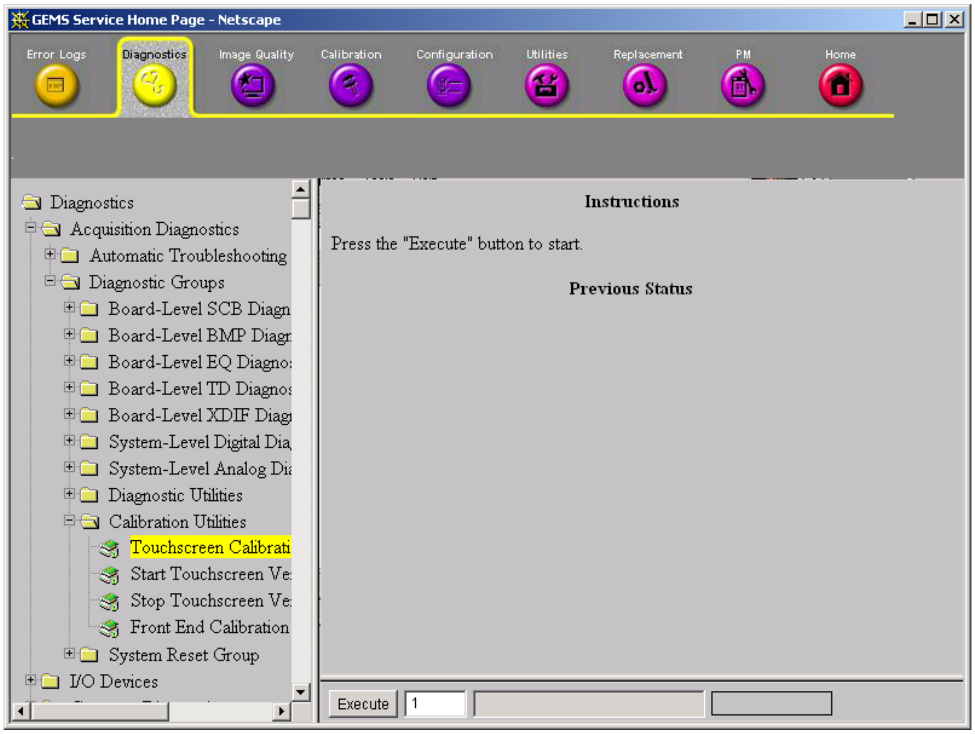
- **Acq HW Information Utility** - Collects all available information about the Acquisition Hardware. This utility enumerates the Acquisition Hardware and writes a file containing all of the Vital Product Data (VPD) associated with each installed board.
- **Transmit Utility - Start**: Selectively fires each transmitter in the System with various parameters for testing purposes.

  This utility exercises the transmitter of each channel, such that external test equipment can measure the generated waveforms. This tests the analog circuitry of the transmitter, as well as the digital generation of the transmit waveforms on the TD's.
- **Transmit Utility** - Change Channel
- **Transmit Utility** - Stop
- **Receive Utility - Single Frame** - Selectively activates each receiver in the System for testing purposes.
- **Receive Utility - 8 Frames**: This utility exercises the receiver of each channel, such that an external source may be used to test the receivers. The received waveform is fed through the Acquisition Hardware and retrieved from the Image Memory.
- **Visual Channel Utility** - The user can selectively turn ON/OFF transmitter and/or receiver channels. By viewing the image as this is done, the user may be able to identify bad channels.

NOTE: This Visual Channel Utility works only with the 10L probe.

- **High Voltage Reset Utility**
- **Probe Select Utility 1-4**
- **Probe ID Read Utility**
- **Commutator State Write Utility -** Diagnostic not yet implemented

7-7-4-10 Calibration Utilities

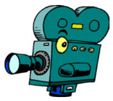


Instructions

Press the "Execute" button to start.

Previous Status

Figure 7-36 Calibration Utilities



Click on the movie camera icon to view the video illustrating the calibration of the Touch Panel.

4 minutes and 47 seconds

Touchscreen Calibration: Follow the directions on the Touchscreen. As each of the cross-hairs appear, touch them with your finger or a pencil eraser. You **MUST** hold your finger on the cross-hair until it moves to the next location. If you just tap the calibration cross-hair, there is a better than average chance your calibration will be corrupt.

NOTE: Do NOT use sharp, pointed objects to press on the Touchscreen. You should also be careful if you have long,sharp finger nails. The Touchscreen can be damaged by sharp objects.

After all the cross-hairs are touched the screen is calibrated.

Start/Stop Touchscreen Verification: Select START TOUCHSCREEN VERIFICATION and EXECUTE. The Start Touchscreen Verification brings up a grid. Each time you touch the screen a small red dots appears.

To terminate the verification, select STOP TOUCHSCREEN VERIFICATION and EXECUTE.

Front-End Calibration Utility - DC Offset: All probes must be disconnected. Measures the DC offset of each channel and writes a calibration file for use in zeroing the offset. Application code may then utilize these values to zero each channel's DC offset, by appropriately programming the Rigel beam forming ASIC's on the TD's.

Section 7-8
Preferred Test Strategy for PCI 9054 Interface

NOTE: This only applies to systems with the SCB, EQ and BMP boards configuration. This does not apply to systems with EBM Boards.

Several LOGIQ™ 9 circuit boards utilize the PCI 9054 *PCI Bus Master I/O Accelerator* chip. This section defines a common testing strategy for a PCI interface implemented with the 9054. Deviation from this strategy may be required or preferable in some circumstances. When this is the case, the diagnostic's SDD must note the deviation.

Depending upon where in the diagnostic an error is found, the nature of the error can be determined. The following are examples of messages that may be reported:

- Bad C/BE# Line (give number)
- Bad AD Line (give number)
- Bad Serial EEPROM

7-8-1 General Strategy

Some degree of functionality is already tested when the system boots up and enumerates the PCI bus. The idea here is to toggle all of the relevant PCI signals to determine if they are functioning (it's possible that the PCI interface was detected and set up by the host, but only by luck due to some signal error). The focus is on the C/BE# signals and the AD lines. Also, we want to know that the serial EEPROM is communicating properly with the PCI 9054. For all practical purposes, the control lines on the PCI bus will need to be functioning properly for all of the data transfers to occur correctly.

While this testing strategy is complete in terms of the signal lines, there is no explicit validation that memory reads and writes will function properly, due, for instance, to some error in the PCI 9054 chip (all of the interface accesses occur through the VPD functionality, as described below). Any 9054 memory access errors will be found during the board's memory test.

Also, this interface test does not test the DMA functionality on the 9054, since these DMA channels are not utilized by most 9054 implementations in LOGIQ™ 9. Any DMA functionality that is used will be tested via a board-level or system-level memory diagnostic (notably, TD Channel Memory transfers from the SCB).

Lastly, PCI timing issues (e.g. wait states, delayed reads, etc.) are not tested. It is assumed that any required timing functionality in the interface will be tested during the board's memory test.

7-8-1-1 Strategy for Testing the C/BE# Signals

By selectively asserting each of the byte enable bits for four successive reads, the validity of the C/BE# signals can be verified. This will suffice for testing the various commands that can be issued over the PCI bus. Testing the command modes explicitly would be significantly more difficult. Also, not all boards support all commands, and the pre-fetching modes are hard to verify before the on-board memory itself, is verified.

7-8-1-2 Strategy for Testing the AD Signals

Since the address and data are multiplexed on the PCI bus, we can utilize the data to validate the signal lines.

7-8-1-3 Strategy for Testing the EEPROM Link

The VPD function of the PCI 9054 allows the host to write and read from the serial EEPROM. An Lword location in the EEPROM is reserved for this purpose.

7-8-2 The PCI Interface Test Details

The following accesses to the VPD functionality must be performed with Configuration Reads/Writes.

Given the reserved diagnostic location in the VPD:

1.) Write the Lword 0x7856 3412 to the VPD location.
2.) Next, read back the entire Lword, and note its value, even if it's not what was written.
3.) Now, read back the data again, excluding the least significant byte, and ensure that the upper three bytes match the upper three bytes of the data read back in step 2.
4.) Repeat steps 1-3 three more times, each time changing the excluded byte location.
5.) Finally, utilizing multiple writes and reads, walk ones and zeros up the AD lines (same address, different data) to ensure that they are functioning.

Steps 1-4 will verify the C/BE# signal lines, even if the data read back is corrupt. Note that if the data is too corrupt (the read in step 2 can't distinguish the bytes) then the test must fail. Otherwise, as long as the byte reads match the corresponding bytes of the Lword read, the C/BE# signal lines are verified.

⚠ **NOTICE** The byte-wide access must not be implemented with an Lword access followed by a masking operation on the host. This type of byte-wide access won't test the C/BE# signal lines.

NOTE: If all of the reads performed here result in all 0's being read, there is likely a problem with the EEPROM, not the PCI bus, itself. This should be reported to the user.

7-8-3 Verifying the PCI Interface Test

The following steps are suggested as a means of verifying a PCI Interface diagnostic that utilizes this strategy:

- Check the C/BE# lines with a logic analyzer, to ensure that the byte-wide accesses are individually asserting each of these signals.
- Corrupt the C/BE# lines and verify failure.
- Corrupt the AD lines and verify failure.
- Corrupt various pins on the EEPROM and verify failure.

Section 7-9
Preferred Test Strategy for Memory

It is desirable to have a uniform memory testing strategy across the entire platform. This section defines a common testing strategy for on-board memory. Deviation from this strategy may be required or preferable in some circumstances. When this is the case, the diagnostic's SDD must note the deviation.

The three things that require testing for any memory are:

- The address bits
- The data bits
- The internal memory cells

As with all diagnostics, execution time is an important consideration. This strategy has been developed with that in mind.

Note that this procedure holds for registers, also. In that case however, "testing the address bits" is irrelevant. Also, for registers, we additionally need to test for floating pins.

Depending upon where in the diagnostic an error is found, the nature of the error can be determined. The following are examples of messages that can be reported:

- Bad Address Bit (give number)
- Bad Data Bit (give number)
- Bad Memory Cell (give address and bit)
- Floating Pin (give register address and bit)

Also, a log file consisting of memory addresses, expected data values, actual data values and bit-wise differences should be provided. For example, a line in the log file might look like this:

Address Offset	Expected Data	Actual Data	Difference Mask
56 (0x38)	0x38 (0011 1000b)	0x2A (0010 1010b)	0x12 (0001 0010b)

7-9-1 General Strategy

This strategy is intended to fully test the address and data lines of a memory device and satisfactorily test the device's internal memory cells, while minimizing the number of read and write cycles required.

7-9-1-1 Strategy for Testing the Address Bits

Consider the address memory locations defined by having a single "1" or a single "0" in the address, as seen by the memory device. Write a unique data value to each of these addresses, and then read and verify the data. Next, write the bit-wise inverse of the same data to the same locations, and then read and verify the inverted data. At this point, the address lines of the memory are fully tested.

7-9-1-2 Strategy for Testing the Data Bits

To fully test the memory's data bits, start at the base address and write all of the data words defined by having a single "1" or single "0" to the memory. Read and verify the data.

NOTE: The designer can combine some or all of the data testing within the address testing.

7-9-1-3 Strategy for Testing the Internal Memory Cells

To test the internal memory cells, start at the base address and fill the memory with an alternating pattern of:

0x55555555
0xAAAAAAAA
0x55555555
...
(masked appropriately)

Read and verify the data. Repeat this, filling the memory with an alternating pattern of:

0xAAAAAAAA
0x55555555
0xAAAAAAAA
…
(masked appropriately)

Read and verify the data.

This test for the memory cells is not exhaustive. However, it does ensure that adjacent cells are not stuck together and that each cell can take on a "1" or a "0" value.

7-9-1-4 Strategy for Testing for Floating Pins (Registers Only)

Anytime a write-then-read operation is performed on a memory location, such as a register, it is possible for certain faults (e.g. disconnected pins) to go undetected. This is due to the time it takes for a data line to settle to its default value (through a pull-up resistor). If the write-then-read turnaround time is fast enough, and a register pin is not connected to the data line on the circuit board, then the read operation will only reflect the un-relaxed data line, instead of the register's memory cell at that bit.

To uncover a floating pin fault, perform the following steps:

- Write all zeros to the register - 0x0000 0000 with no mask.
- Next, write all ones to a different register on the same data bus - 0xFFFF FFFF (again, no mask).
- Read the first register, apply the data mask, and verify that the data is all zeros. Any 1's in the read data imply a floating pin at that bit.

7-9-1-5 Strategy for Testing Multiple-Part RAM's

Special consideration must be paid to the data patterns written to a RAM that is implemented with more than one parts. For example, consider a 32-bit wide RAM that is implemented with 8 4-bit wide parts. For this RAM, the test data pattern width must be considered to be 4 bits wide and repeated on all eight nibbles of the 32-bit Lword. For example, if we wanted to write 0x3 to test the data bits, we should write 0x33333333, such that each of the eight nibble-wide parts have the test data applied. Thus, the maximum one-hot (one "1", all the rest "0") data value we would ever write to the local memory is 0x8, which would be applied to the RAM as 0x88888888.

When implementing the Preferred Strategy for Testing Memory for a multiple-part RAM, simply consider the data width to be as wide as a single part, repeating the data to fill the 32-bit Lword. The procedure then still holds.

Additionally, this test must ensure that the individual RAM devices are all being accessed. To that end, unique data must be written to each part. Thus, (continuing with the 8, 4-bit wide RAM example) we have the additional need to apply test data such as 0x00000008, x00000090, 0x00000A00, 0x0000B000, 0x000C0000, 0x00D00000, 0x0E000000, and 0xF0000000 to eight different local RAM addresses. When this data is read back and verified, we know that the data lines are not crossed or corrupted.

The reasoning behind all of this is that if the data is incrementing from a small value, for instance, then all zero data will be written to and read from devices that comprise the most significant data in the RAM bank. Therefore, we can't be sure that these devices are being addressed properly (assuming the non-targeted locations contain zeros too). Utilizing the bitwise inverse of the data in the address test somewhat alleviates this problem; however, there is little overhead associated with the extra accesses to ensure that individual RAM devices are all being accessed properly.

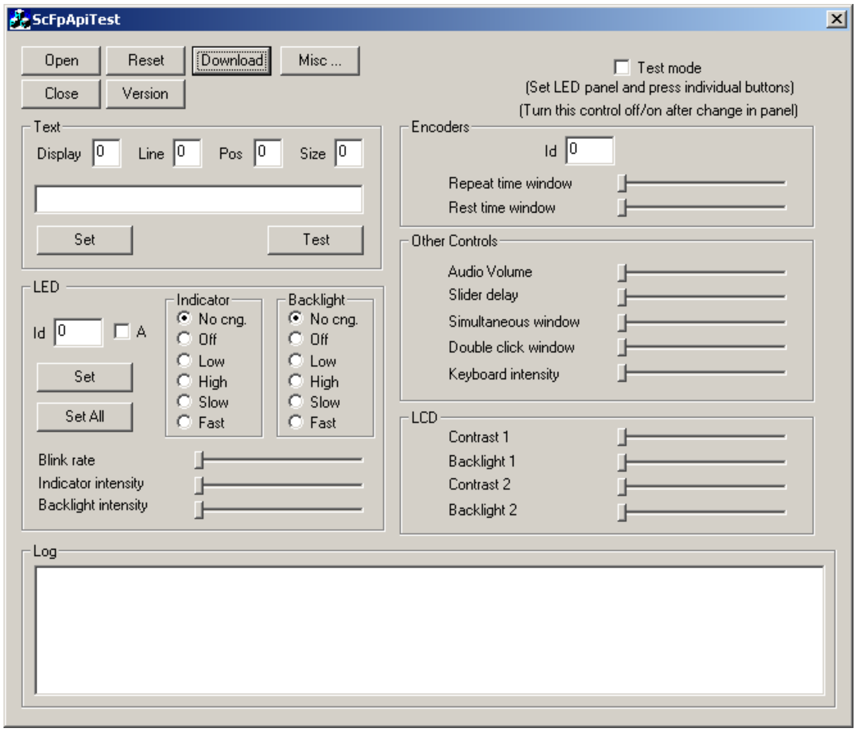
Section 7-10
I/O Devices

7-10-1 OP Panel Utilities - OP Panel Interface

Front Panel key functionality can be tested using a program (ScFpApiTest) currently accessed through Service Diagnostic User Interface or by running the program located on the “C” drive of the Back End Processor.

7-10-2 Launching the Program without the Global Service User Interface

1.) The Ultrasound Scanner should be turned off.
2.) Install the service key in the USB port on the External I/O.
3.) Power up the Ultrasound Scanner.
4.) At the first popup window select MAINTENANCE MODE.
5.) Enter the current service password.
6.) Select the EXIT TO WINDOWS option.
7.) In Windows select START > RUN
8.) Type in: *C:\Musashi\target\bin\ScFpApiTest.exe.*
9.) Click on OK.



☐ Test mode

Display 0 Line 0 Pos 0 Size 0

Encoders Id 0

LED Id 0 ☐ A

Indicator: ● No cng.

Backlight: ● No cng.

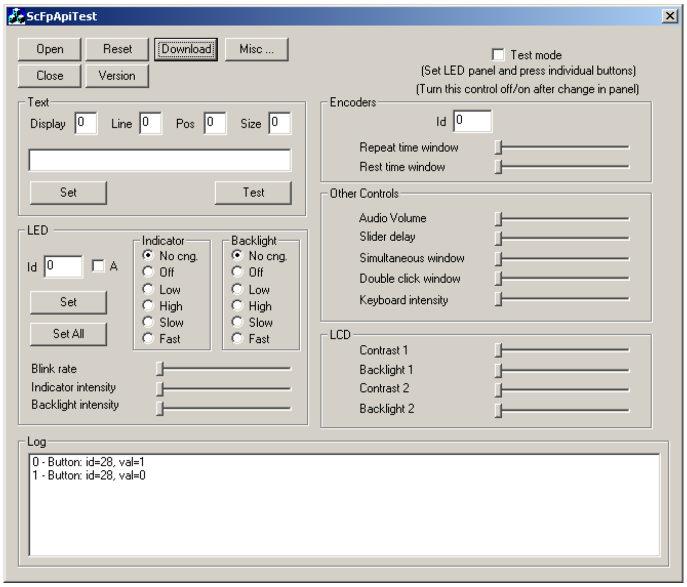
Figure 7-37 ScFpApiTest Screen

10.) Click on VERSION. If there is communication with the keyboard there will be a readout of the software version In the Log area

7-10-3 Testing the Front Panel Keys

With the ScFpApiTest active, push a button on the keyboard. A readout of the button id number and the indication that it was pushed and released (1 and 0) will appear in the Log area as shown in Figure 7-38.

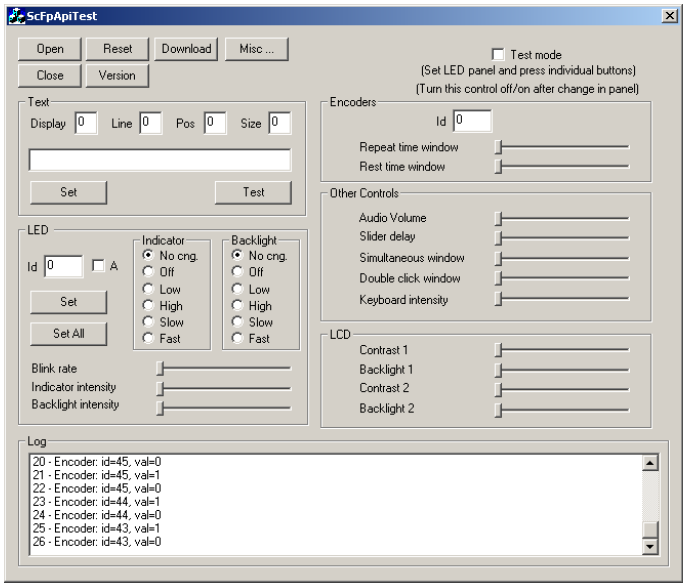
The button id list is not available. The id number of the button is not important. What is important is the fact that a 1 and 0 are returned indicating the button push and release.



```
0 - Button: id=28, val=1
1 - Button: id=28, val=0
```

Figure 7-38 Button Push Result

Test encoders by rotating them and getting relative values as indicated in Figure 7-39.

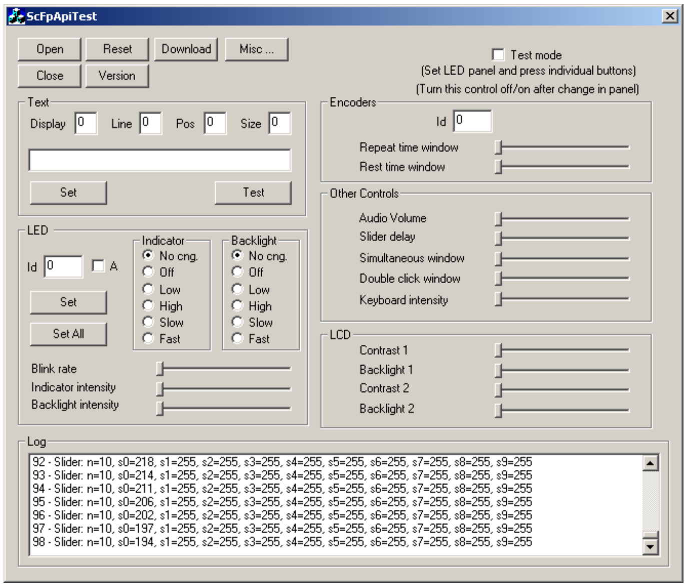


```
20 - Encoder: id=45, val=0
21 - Encoder: id=45, val=1
22 - Encoder: id=45, val=0
23 - Encoder: id=44, val=1
24 - Encoder: id=44, val=0
25 - Encoder: id=43, val=1
26 - Encoder: id=43, val=0
```

Figure 7-39 Encoder Rotation Results

The important thing is the return of a 1 and 0 as the encoder is rotated.

Test slide pots (TGC) by moving them through their range. Feedback will be returned to the Log area as shown in Figure 7-40.



☐ Test mode

Display 0 Line 0 Pos 0 Size 0

Id 0 ☐ A

Indicator: ● No cng. ○ Off ○ Low ○ High ○ Slow ○ Fast

Backlight: ● No cng. ○ Off ○ Low ○ High ○ Slow ○ Fast

Encoders Id 0

```
92 - Slider: n=10, s0=218, s1=255, s2=255, s3=255, s4=255, s5=255, s6=255, s7=255, s8=255, s9=255
93 - Slider: n=10, s0=214, s1=255, s2=255, s3=255, s4=255, s5=255, s6=255, s7=255, s8=255, s9=255
94 - Slider: n=10, s0=211, s1=255, s2=255, s3=255, s4=255, s5=255, s6=255, s7=255, s8=255, s9=255
95 - Slider: n=10, s0=206, s1=255, s2=255, s3=255, s4=255, s5=255, s6=255, s7=255, s8=255, s9=255
96 - Slider: n=10, s0=202, s1=255, s2=255, s3=255, s4=255, s5=255, s6=255, s7=255, s8=255, s9=255
97 - Slider: n=10, s0=197, s1=255, s2=255, s3=255, s4=255, s5=255, s6=255, s7=255, s8=255, s9=255
98 - Slider: n=10, s0=194, s1=255, s2=255, s3=255, s4=255, s5=255, s6=255, s7=255, s8=255, s9=255
```

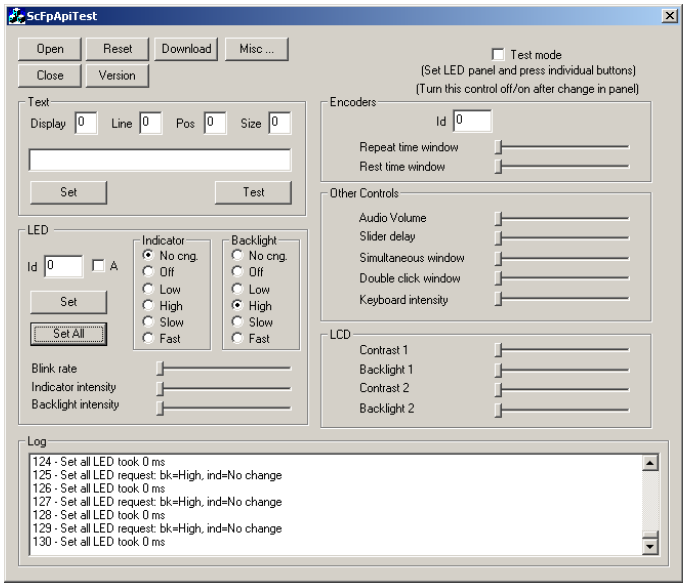
Figure 7-40 Slide Pot Test Results

The important thing to watch here is the slide pot number that is moving and ensure that it's value changes. In Figure 7-40 slide pot s0 is changing.

NOTE: *It is important to remember that the trackball and alpha-numeric keyboard are not tested by this program. Moving the cursor in Windows with trackball would indicate its functionality. PC Diagnostics in the Common Service Interface will check the alpha-numeric keyboard.*

7-10-4 Front Panel Light Tests

From the ScFpApiTest screen, the front panel indicator light function can be tested.



☐ Test mode
(Set LED panel and press individual buttons)
(Turn this control off/on after change in panel)

Display 0 Line 0 Pos 0 Size 0

Id 0

Id 0 ☐ A

Indicator: ● No cng. ○ Off ○ Low ○ High ○ Slow ○ Fast

Backlight: ○ No cng. ○ Off ○ Low ● High ○ Slow ○ Fast

```
124 - Set all LED took 0 ms
125 - Set all LED request: bk=High, ind=No change
126 - Set all LED took 0 ms
127 - Set all LED request: bk=High, ind=No change
128 - Set all LED took 0 ms
129 - Set all LED request: bk=High, ind=No change
130 - Set all LED took 0 ms
```

Figure 7-41

1.) In the LED section of the dialog box, under Indicator, select High.
2.) Click on SET ALL. All lights on the front panel that are capable should turn green.
3.) In the LED section of the dialog box, under Indicator, select Off.
4.) Click on SET ALL. All lights on the front panel that are capable should turn off.

From the ScFpApiTest screen the front panel backlight function can be tested.

1.) In the LED section of the dialog box, under Backlight, select High.
2.) Click on SET ALL. All lights on the front panel that are capable should turn amber (yellow).
3.) In the LED section of the dialog box, under Backlight, select Off.
4.) Click on SET ALL. All lights on the front panel that are capable should turn off.

7-10-5 Ending the Program

When testing is complete you must close out of Windows, shutdown the system and **reboot** the Ultrasound Scanner to return to the applications scanning mode.

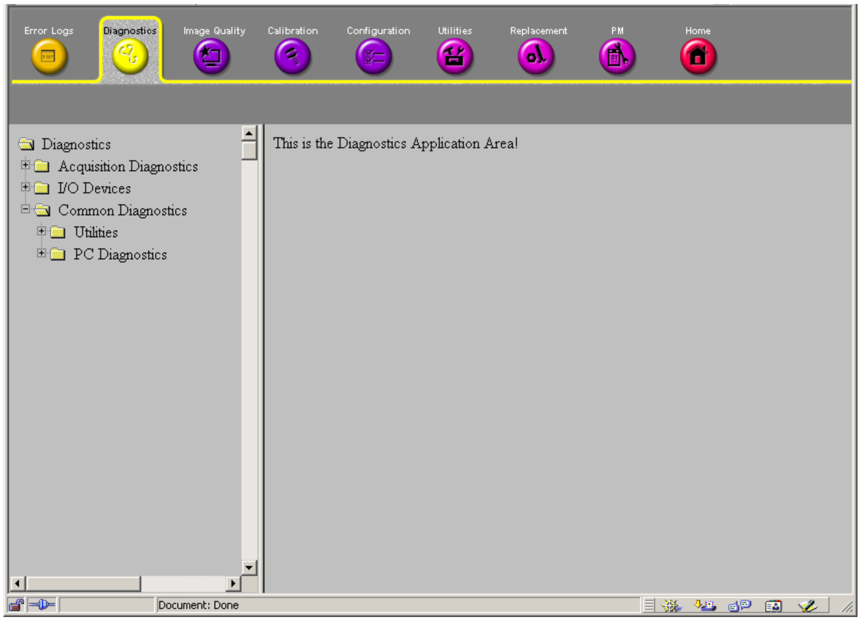
7-10-6 Console Troubleshooting Aids

For more information on troubleshooting console problems with audio, microphone, power and control, refer to Section 5-5 "Operator Console Control PWA" on page 5-31.

Section 7-11
Common Diagnostics

Common Diagnostics is the second main heading under the GSUI heading of Diagnostics.

Figure 7-42 shows the top level menu choices under Common Diagnostics. The subheadings and their respective diagnostic/troubleshooting menu choices are called out and described in the sections below.



This is the Diagnostics Application Area!

Document: Done

Figure 7-42 Common Diagnostics

7-11-1 Utilities

Provides two selections:

7-11-1-1 Disruptive Mode

Allows you to enable or disable disruptive mode troubleshooting. If you are accessing through InSite, this can only be enabled with the customer/operator confirmation.

7-11-1-2 System Shutdown

Allows for system shutdown from the diagnostic menu. Select to *Restart System* or *Shutdown System.* Also, select to retain Disruptive Mode or Not.

After submitting to restart or shutdown a confirmation screen gives one last chance to confirm or cancel the request.

7-11-2 PC Diagnostics (Non-Interactive Tests)

7-11-2-1 CPU Tests

- **CPU Test (All)** - This diagnostic performs a battery of tests on your CPU to ensure it is working properly. The following tests are a complete list of the tests performed on the PC's CPU.
- **CPU: Registers** - The CPU registers are tested using the default test patterns defined above. On 32 bit CPUs, the extended registers are also checked. If errors are detected, the failed registers are listed.
- **CPU: Arithimetics** - Tests the proper function of arithmetic commands ADC, ADD, DEC, DIV, IDIV, IMUL, INC, MUL, SBB and SUB with 16 and 32-bit operands. If errors are detected, the failed commands and operands are listed.
- **CPU: String Operations** - Tests the proper operation of string commands LODS, MOVS, SCAS and STOS with 8, 16 and 32-bit operands. If errors are detected, the failed commands and operands are listed.
- **CPU: Logical Operations** - Tests the proper operation of logical operations AND, NOT, OR and XOR with 16 and 32-bit operands. If errors are detected, the failed operands are listed.
- **CPU: Math Registers** - Tests coprocessor register stack, pointers and commands FLDLZ, FLDPI, FLDLN2, FLDLG2, FLDL2T, FLDL2E and FLD1. If errors are detected, the failed steps and commands are listed.
- **CPU: Math Commands** - Tests coprocessor commands FBLD/FBSTP, FLD/FST, FXCH, FCOM, FICOM, FTST, FXAM and FUCOM. If errors are detected, the failed instructions are listed.
- **CPU: Math Arithimetics** -
- **CPU: Transcendental** - Tests coprocessor transcendental commands F2XM1, FPATAN, FPTAN, FYL2X, FYL2XP1, FCOS, FSIN and FSINCOS. If errors are detected, the failed commands are listed.
- **CPU: MMX Arithmetic** - Tests MMX commands PADD, PSUB, PMUL and PMADD. If errors are detected, the failed commands are listed.
- **CPU: MMX Logical** - Tests MMX commands PAND, PANDN, POR and PXOR. If errors are detected, the failed commands are listed.
- **CPU: MMX Shift** - Tests MMX commands PSLL and PSRL. If errors are detected, the failed commands are listed.
- **CPU: MMX Data Transfer** - Tests MMX commands MOVD and MOVQ. If errors are detected, the failed commands are listed.
- **CPU: MMX Misc.** - Tests MMX commands PCMPEQ, PCMPGT, PACKSS, PACKUS, PUNPCK and PUNPCK. If errors are detected, the failed commands are listed.

7-11-2-2 Hard Drive Tests

- **Hard Drive Test (All)** - The Hard Drive test examines your hard disk drive using a series of tests to ensure that your drive can perform its functions.

  The following tests are performed on your hard drive to ensure the hard disk controller and the drive mechanism are working correctly. The disk surface itself is also checked.

NOTE: The hard drive test can take over ten minutes.

- **Hard Drive: Linear Seek** - Hard disk drive heads are moved from track 0 to the maximum track one track at a time.
- **Hard Drive: Random Seek** - Hard disk drive heads are moved randomly several hundred times.
- **Hard Drive: Funnel Seek** - Hard disk drive heads are moved in a funnel fashion, i.e., from the first track on the drive to the last, then to the second track, then to the second to last track, then to the third track, and so on.
- **Hard Drive: Surface Scan** - This test scans for surface defects on the hard disk drive.

7-11-2-3 Memory Tests

- **Memory Test (All)** - Eighteen test patterns are used to test memory locations. If errors are detected, the address of the block the error was detected in is shown. During testing, these diagnostics will also look out for parity errors and other exceptions. These will be added to the Test Log as errors if encountered.
- **Memory: Pattern Test** - PC-Doctor uses several test patterns to test as much memory as possible.
- **Memory: Parity Test** - This test checks for parity errors on the memory bus during intensive string transfer operations. If an error is detected, the address of the failed block is displayed.

7-11-2-4 CD/DVD Drive Test

NOTE: Although the global aspect of the diagnostics allow for DVD testing, the LOGIQ™ 9 does not have a DVD drive.

- **DVD/CD-ROM Test (All)** - The CD-ROM/DVD test examines the CD-ROM/DVD drive to make sure it is working properly. You may use either a data CD-ROM disk or a DVD disk for these tests. You cannot use an audio CD, such as a regular commercial music CD, with this test.

NOTE: The PC is sometimes slow in recognizing a newly inserted CD-ROM/DVD disk. It is best to wait a few seconds after inserting a disk into the drive before you run any tests.

There are two types of CD-ROM/DVD tests:

1.) *Seek Tests:* Ensures the drive can access all locations on a disk, and
2.) *Read Tests:* Ensures the drive can read all the data.

- **DVD/CD-ROM: Linear Seek** - Tests that all locations can be accessed on a CD-ROM or DVD disk in a linear fashion, starting from the first to the last.
- **DVD/CD-ROM: Random Seek** - Tests that all locations can be accessed on a CD-ROM or DVD disk randomly.
- **DVD/CD-ROM: Funnel Seek** - Tests that all locations can be accessed on a CD-ROM or DVD disk in a funnel fashion, starting from the first then moving to the last, then, at the next pass starting from the second location then moving to the next to the last, and so on
- **DVD/CD-ROM: Linear Read** - Reads the data on the CD-ROM or DVD in a linear fashion, starting from the start to the end.
- **DVD/CD-ROM: Random Read** - Reads the data on the CD-ROM or DVD randomly.

7-11-2-5 Video Test

- **Video Test (All)** - This diagnostic tests your system's video capabilities. This involves testing the video memory with 18 patterns, testing your graphics acceleration, and text output. You will see these tests being performed on your monitor.

  You can cancel this test at any time by hitting the Escape (Esc) key.

The following tests are performed on your monitor:

- **Video: Memory** - Video memory is tested by filling the video buffer with 18 test patterns, one pattern at a time. The tests will fill the entire screen with a single color.
- **Video: Data Transfer** - This tests the graphics acceleration part of your video controller. These tests will appear on your screen as black and white concentric squares and rectangles of various sizes and colors. If errors are detected, the locations of the problems are displayed.
- **Video: Text Output** - This test prints a text string in random sizes and colors to tests your video device driver and video controller.

7-11-2-6 USB Test

- **USB Test (All)**
- **USB Configuration Test** -
- **USB Devices Test** -

7-11-2-7 PCI Board Configuration Test

A bus is a set of circuits, wires or connectors which connect the various components of your system. A PCI (Peripheral Component Interconnect) bus is a fast standard bus which is common in Pentium systems. Various tests are run on the PCI bus in order to ensure it is working up to speed.

The motherboard is scanned to verify the configuration space and to make sure the diagnostics can communicate with the board.

7-11-2-8 SCSI Device Test

7-11-2-9 AGP Video Card Test

7-11-2-10 Network Test

7-11-3 PC Diagnostics (Interactive Tests)

7-11-3-1 Keyboard Test

1.) Double-click **Keyboard Test** from the PC Diagnostics interactive tests menu.
2.) When you activate the test, you are first asked to choose your keyboard type from the drop-down menu. Usually the default choice is the correct one.
3.) Click the Test button. A keyboard layout is displayed on which you can see the keys of your keyboard.
4.) Press each key on your keyboard once and make sure that the corresponding keys on-screen are removed from view. If a key on-screen is not removed, that key may be damaged and you may have to have your keyboard repaired or replaced.
5.) To reset the keyboard, click the Reset Keys button.
6.) To exit the test, click Close.

7-11-3-2 Audio Test

1.) Double-click **Audio Test** from the PC Diagnostic interactive tests menu.
2.) To test the WAV sound reproduction click Left Channel, Right Channel, or Both Channels to test your speakers. You should hear a guitar chord.
3.) To test MIDI sound reproduction click the button under MIDI. You should hear a few seconds of recorded music.
4.) Click on the Beep button. You should hear a low "beep" from your PC.

If no sound is produced in these tests, choose the More Info button in the Audio Test dialog box for information about possible causes and solutions.

7-11-3-3 Monitor Test

Double-click **Monitor Test** from the PC Diagnostic interactive tests menu.

The monitor test dialog box presents you with three options:

- **Combination Test** - Checks the monitor for alignment, color depth, and monitor resolution. It will put four cross-hairs in each corner, RGB (Red Green Blue) spectrum arrays and horizontal and vertical alignment bars on the screen.

NOTE: In most cases, you will choose the Combination Test.

- **Solid Color Test** - The solid color test is for laptops and LCD (Liquid Crystal Display) panel display. This test displays solid color screens to allow you to make sure all color pixels are operating correctly.
- **VESA (Video Electronics Standards Association) Test Patterns** - The VESA test patterns checks luminance, geometry, and focus. The VESA tests are designed for professional measurement use.

Section 7-12
Troubleshooting Trees

7-12-1 System Does Not Power On / Boot Up

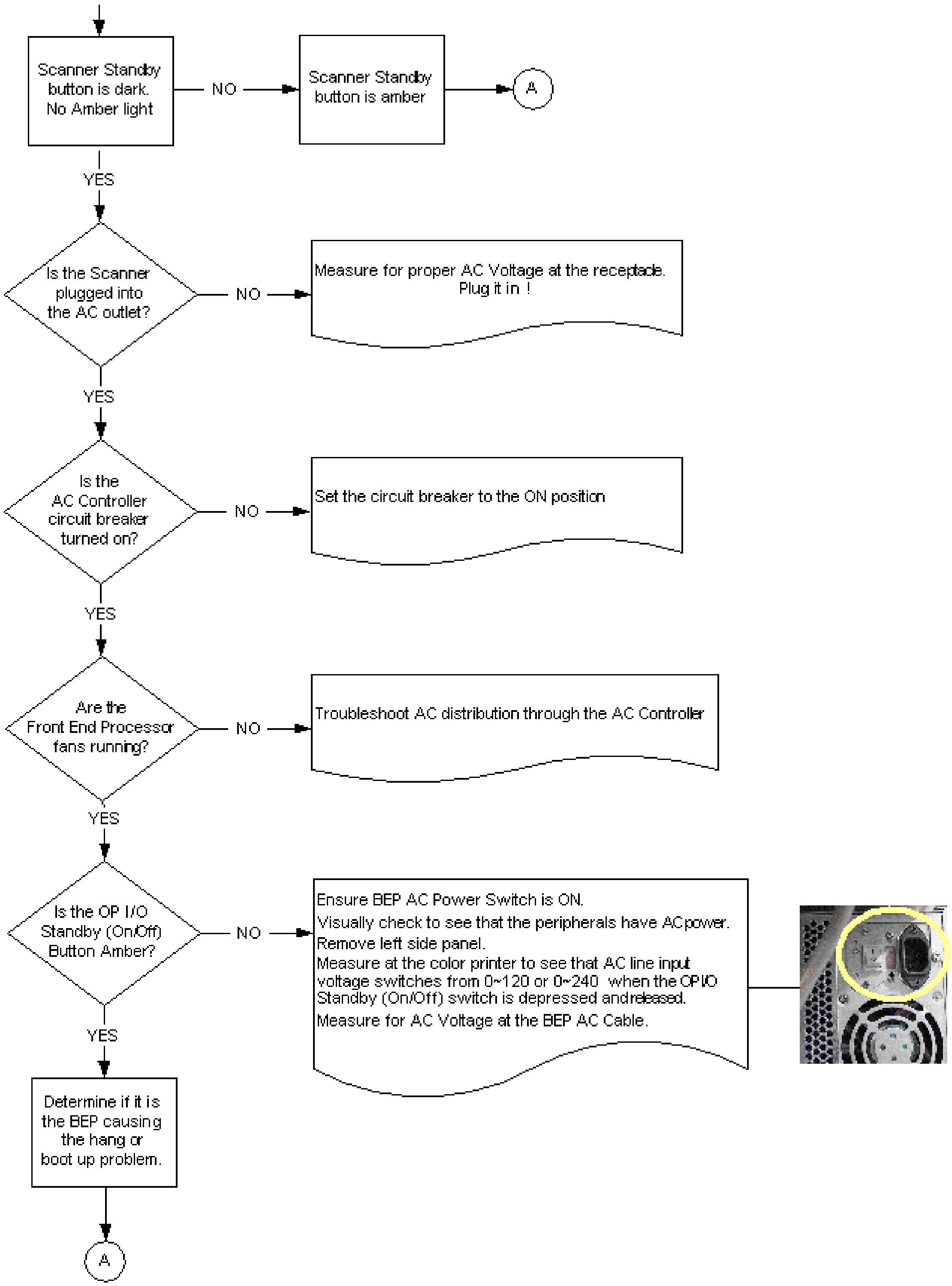

Scanner Standby button is dark. No Amber light
NO
Scanner Standby button is amber
A
YES
Is the Scanner plugged into the AC outlet?
NO
Measure for proper AC Voltage at the receptacle. Plug it in !
YES
Is the AC Controller circuit breaker turned on?
NO
Set the circuit breaker to the ON position
YES
Are the Front End Processor fans running?
NO
Troubleshoot AC distribution through the AC Controller
YES
Is the OP I/O Standby (On/Off) Button Amber?
NO
Ensure BEP AC Power Switch is ON.
Visually check to see that the peripherals have AC power.
Remove left side panel.
Measure at the color printer to see that AC line input voltage switches from 0~120 or 0~240 when the OP I/O Standby (On/Off) switch is depressed and released.
Measure for AC Voltage at the BEP AC Cable.
YES
Determine if it is the BEP causing the hang or boot up problem.
A

Figure 7-43 Power On / Boot Up Flowchart

7-12-2 System Does Not Boot

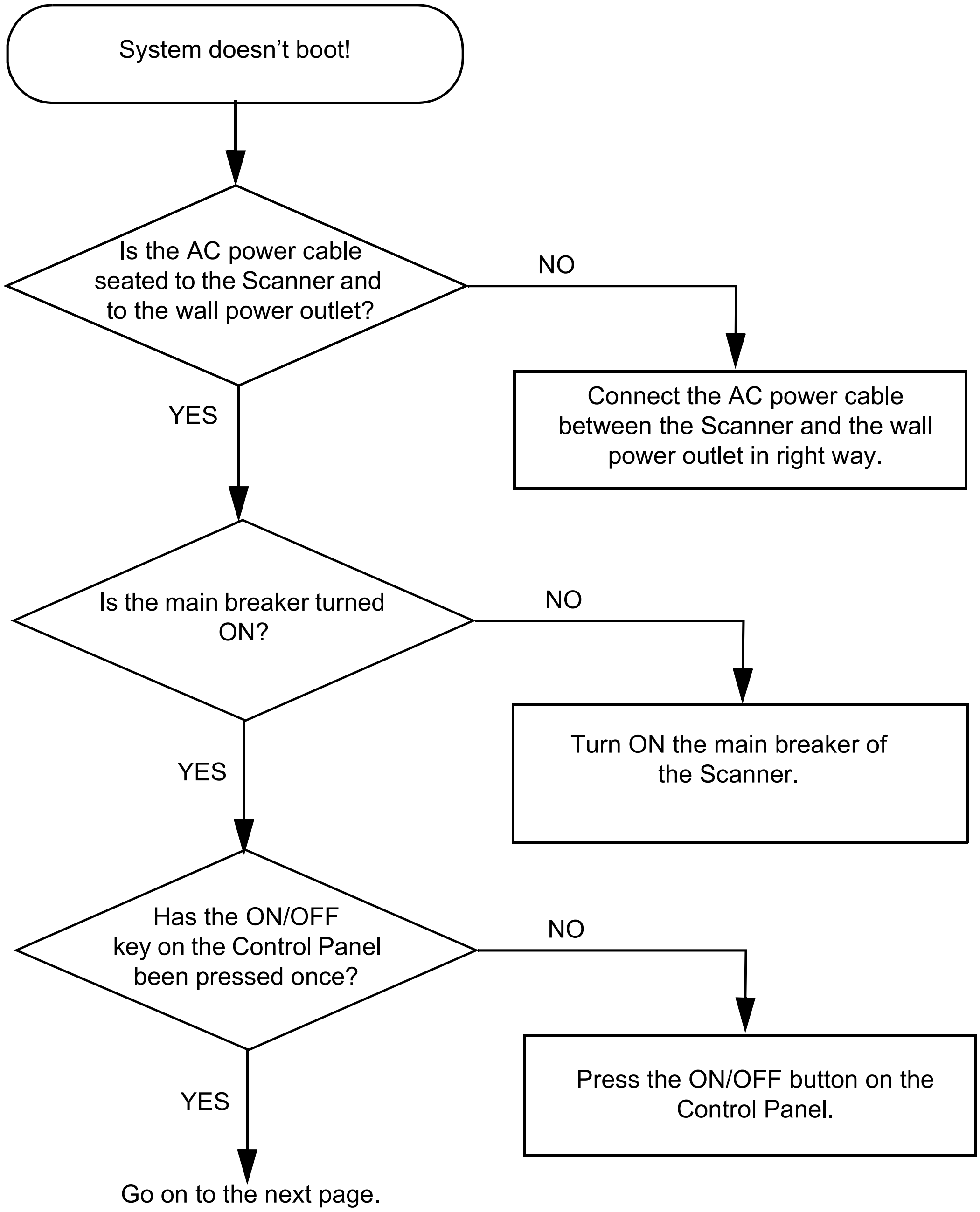

System doesn't boot!
Is the AC power cable seated to the Scanner and to the wall power outlet?
NO
Connect the AC power cable between the Scanner and the wall power outlet in right way.
YES
Is the main breaker turned ON?
NO
Turn ON the main breaker of the Scanner.
YES
Has the ON/OFF key on the Control Panel been pressed once?
NO
Press the ON/OFF button on the Control Panel.
YES
Go on to the next page.

Figure 7-44 System does not Boot

7-12-1System Does Not Power On / Boot Up (cont'd)

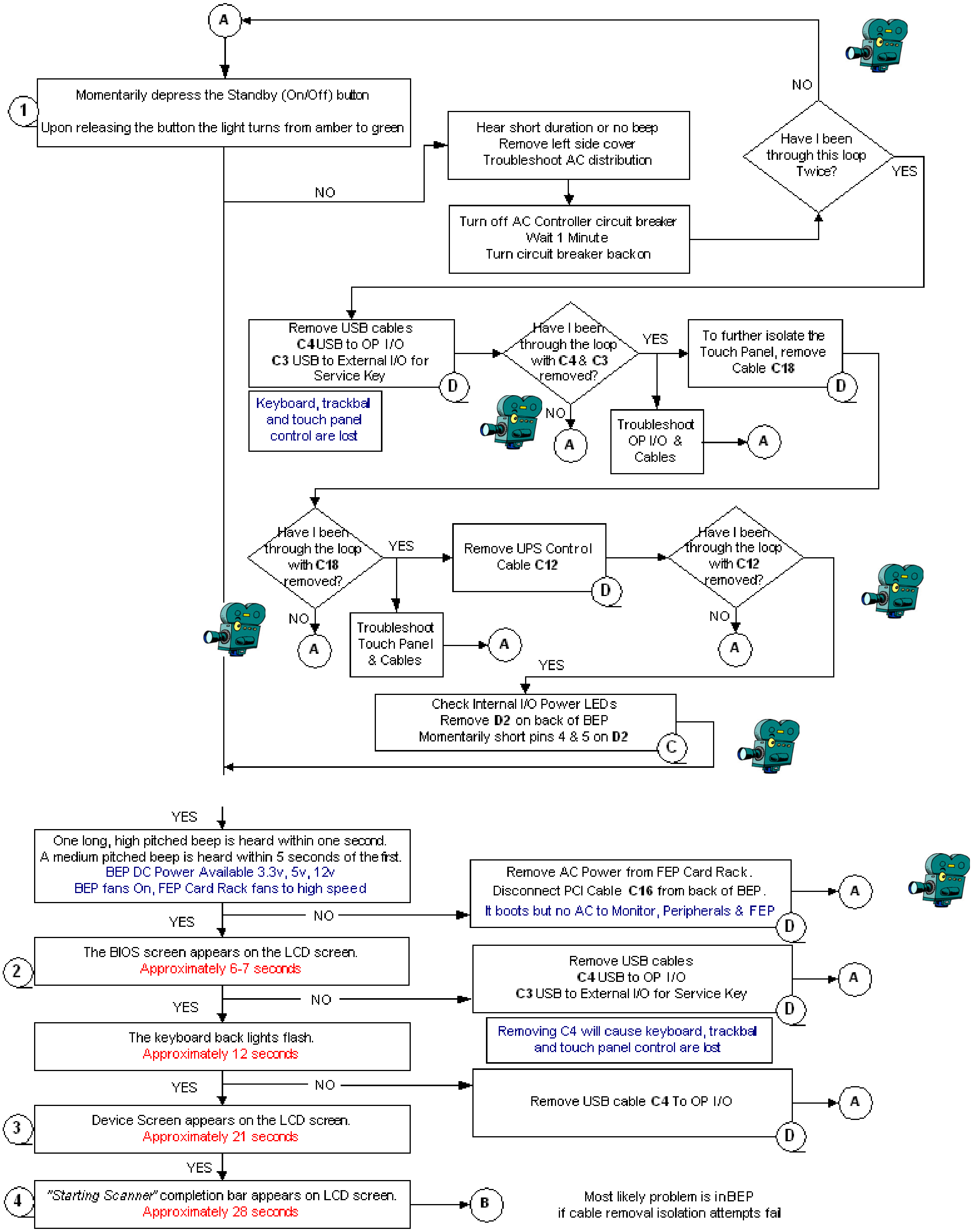

A
1
Momentarily depress the Standby (On/Off) button
Upon releasing the button the light turns from amber to green
NO
Hear short duration or no beep
Remove left side cover
Troubleshoot AC distribution
Turn off AC Controller circuit breaker
Wait 1 Minute
Turn circuit breaker back on
NO
Have I been through this loop Twice?
YES
Remove USB cables
C4 USB to OP I/O
C3 USB to External I/O for Service Key
D
Keyboard, trackball and touch panel control are lost
Have I been through the loop with C4 & C3 removed?
YES
NO
A
To further isolate the Touch Panel, remove Cable C18
D
Troubleshoot OP I/O & Cables
A
Have I been through the loop with C18 removed?
YES
NO
A
Troubleshoot Touch Panel & Cables
A
Remove UPS Control Cable C12
D
Have I been through the loop with C12 removed?
NO
A
YES
Check Internal I/O Power LEDs
Remove D2 on back of BEP
Momentarily short pins 4 & 5 on D2
C
YES
One long, high pitched beep is heard within one second.
A medium pitched beep is heard within 5 seconds of the first.
BEP DC Power Available 3.3v, 5v, 12v
BEP fans On, FEP Card Rack fans to high speed
NO
Remove AC Power from FEP Card Rack.
Disconnect PCI Cable C16 from back of BEP.
It boots but no AC to Monitor, Peripherals & FEP
D
A
YES
2
The BIOS screen appears on the LCD screen.
Approximately 6-7 seconds
NO
Remove USB cables
C4 USB to OP I/O
C3 USB to External I/O for Service Key
D
A
Removing C4 will cause keyboard, trackball and touch panel control are lost
YES
The keyboard back lights flash.
Approximately 12 seconds
NO
Remove USB cable C4 To OP I/O
D
A
YES
3
Device Screen appears on the LCD screen.
Approximately 21 seconds
YES
4
"Starting Scanner" completion bar appears on LCD screen.
Approximately 28 seconds
B
Most likely problem is in BEP if cable removal isolation attempts fail

Figure 7-45 System does not Boot (contd.)

7-12-1System Does Not Power On / Boot Up (cont'd)

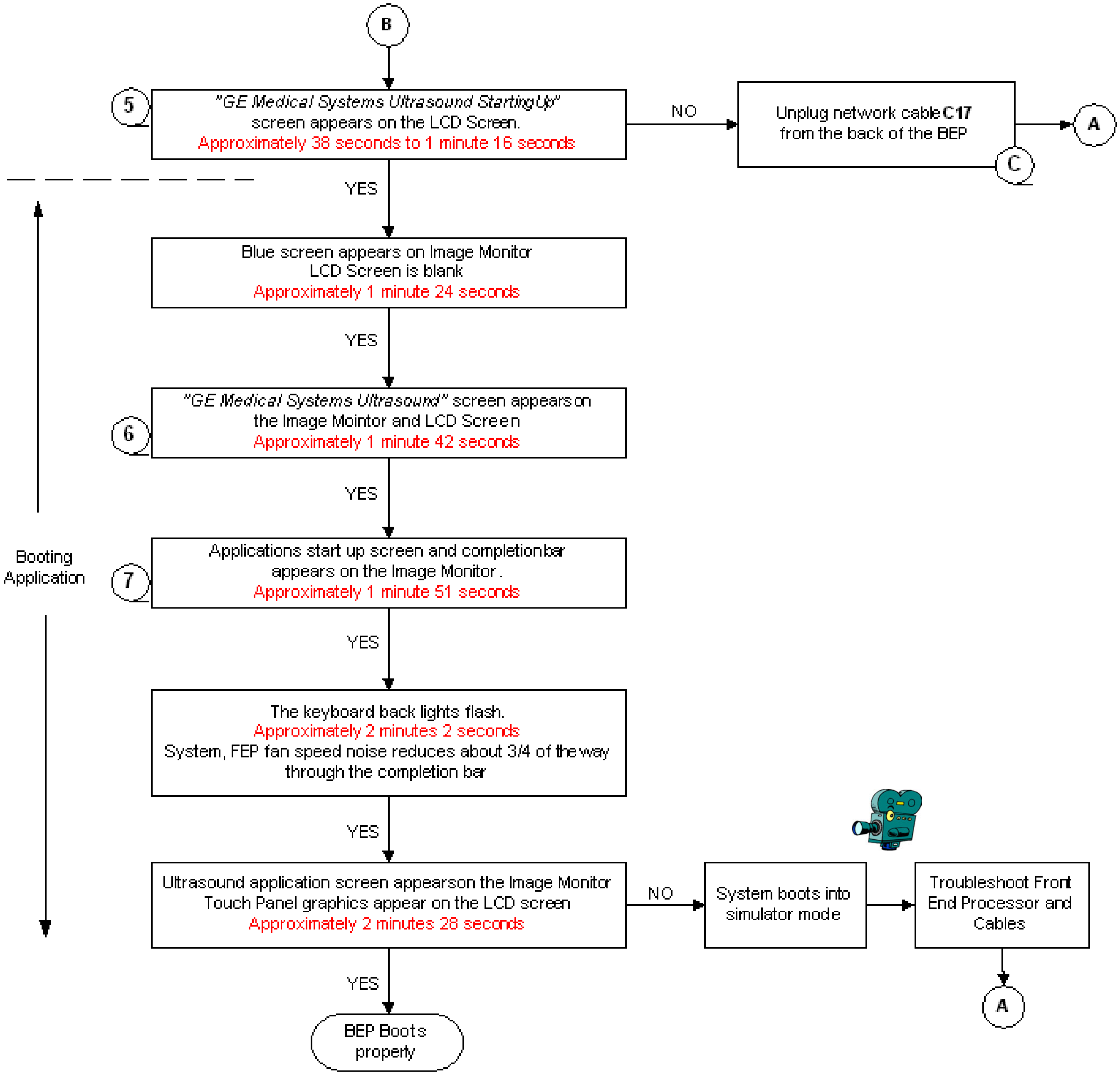
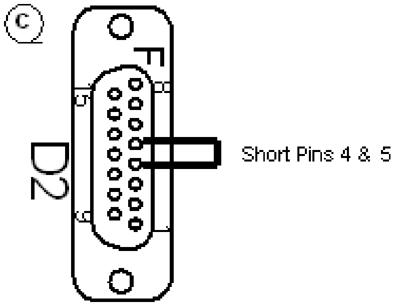

B
5
"GE Medical Systems Ultrasound Starting Up" screen appears on the LCD Screen.
Approximately 38 seconds to 1 minute 16 seconds
NO
Unplug network cable C17 from the back of the BEP
A
C
YES
Blue screen appears on Image Monitor
LCD Screen is blank
Approximately 1 minute 24 seconds
YES
6
"GE Medical Systems Ultrasound" screen appears on the Image Mointor and LCD Screen
Approximately 1 minute 42 seconds
YES
Booting Application
7
Applications start up screen and completion bar appears on the Image Monitor .
Approximately 1 minute 51 seconds
YES
The keyboard back lights flash.
Approximately 2 minutes 2 seconds
System, FEP fan speed noise reduces about 3/4 of the way through the completion bar
YES
Ultrasound application screen appears on the Image Monitor
Touch Panel graphics appear on the LCD screen
Approximately 2 minutes 28 seconds
NO
System boots into simulator mode
Troubleshoot Front End Processor and Cables
A
YES
BEP Boots properly

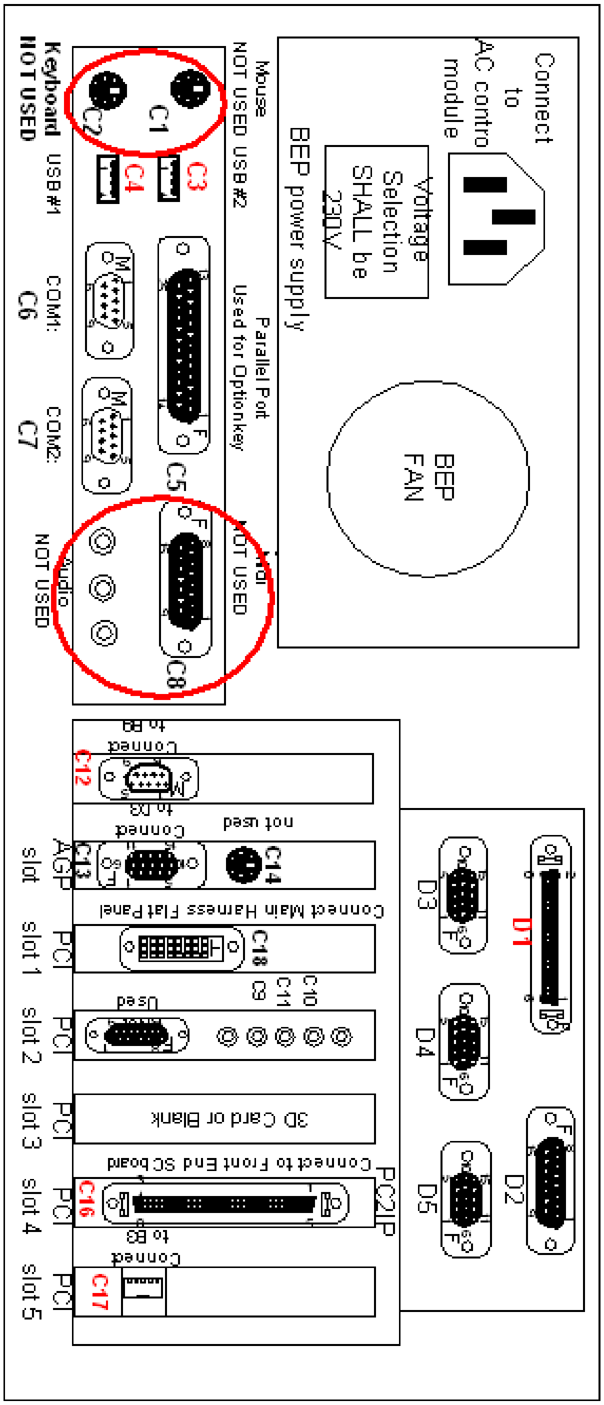
Figure 7-46 System does not Boot (contd.)

Turning off the LOGIQ 9.

Section 7-12Troubleshooting Trees (cont'd)



When you reseat cables:
Ensure that you remove the cable completely.
Install the cable with even pressure on each end and tighten retaining screws evenly.



D

C1 Not Used - BEP Mouse
C2 Not Used - BEP Keyboard
C3 USB#2 External I/O for Service Key
C4 USB#1 Top Console for LCD, Trackball & Control Panel
C5 Parallel Port used for option key
C6 RS232 (COM1)
C7 RS232 (COM2)
C8 Joystick (Not Used)
C9 Audio Out from PCI Sound Card
C10 Audio In to PCI Sound Card
C11 Mic Input to PCI Sound Card
C12 UPS Control Port
C13 SVGA Port from AGP Video Card to D3
C14 Not Used
C16 Connect to Front End SC Board
C17 10/100 Ethernet Port
C18 Digital Video to flat panel

D1 Signals to I/O boards
D2 Power to I/O boards
D3 SVGA in from BEP video board (from C13)
D4 SVGA out to top console (19 inch monitor)
D5 RGB out to color printer

Figure 7-47 BEP1 Connector Reference

Section 7-12Troubleshooting Trees (cont'd)

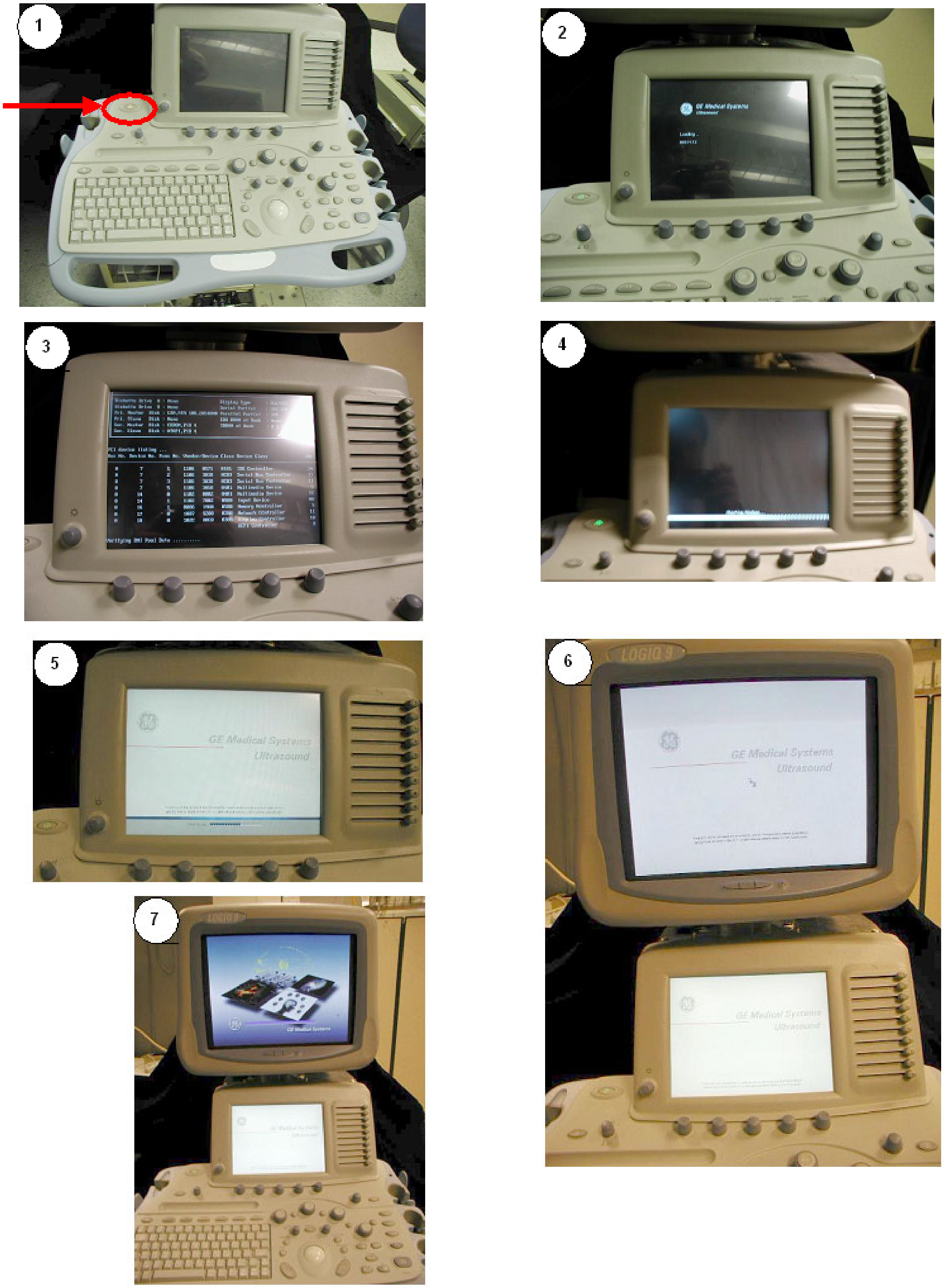


Figure 7-48 Boot Sequence Illustrations

7-12-3 Noise in Image

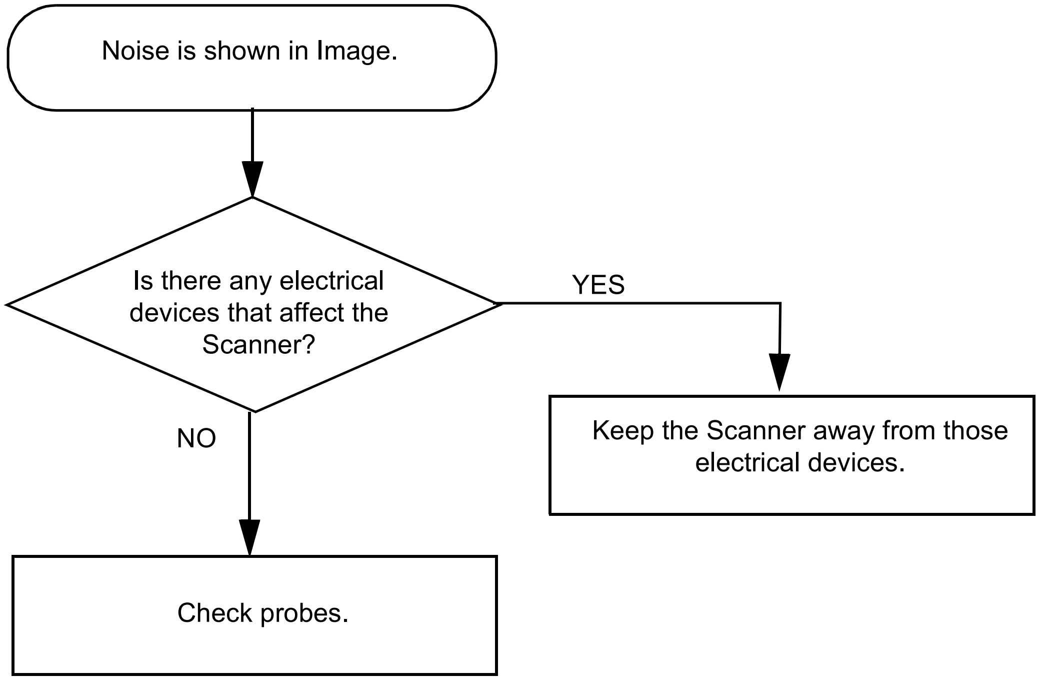

Noise is shown in Image.
Is there any electrical devices that affect the Scanner?
YES
NO
Keep the Scanner away from those electrical devices.
Check probes.

Figure 7-49 Noise in Image

7-12-4 Unable to Scan

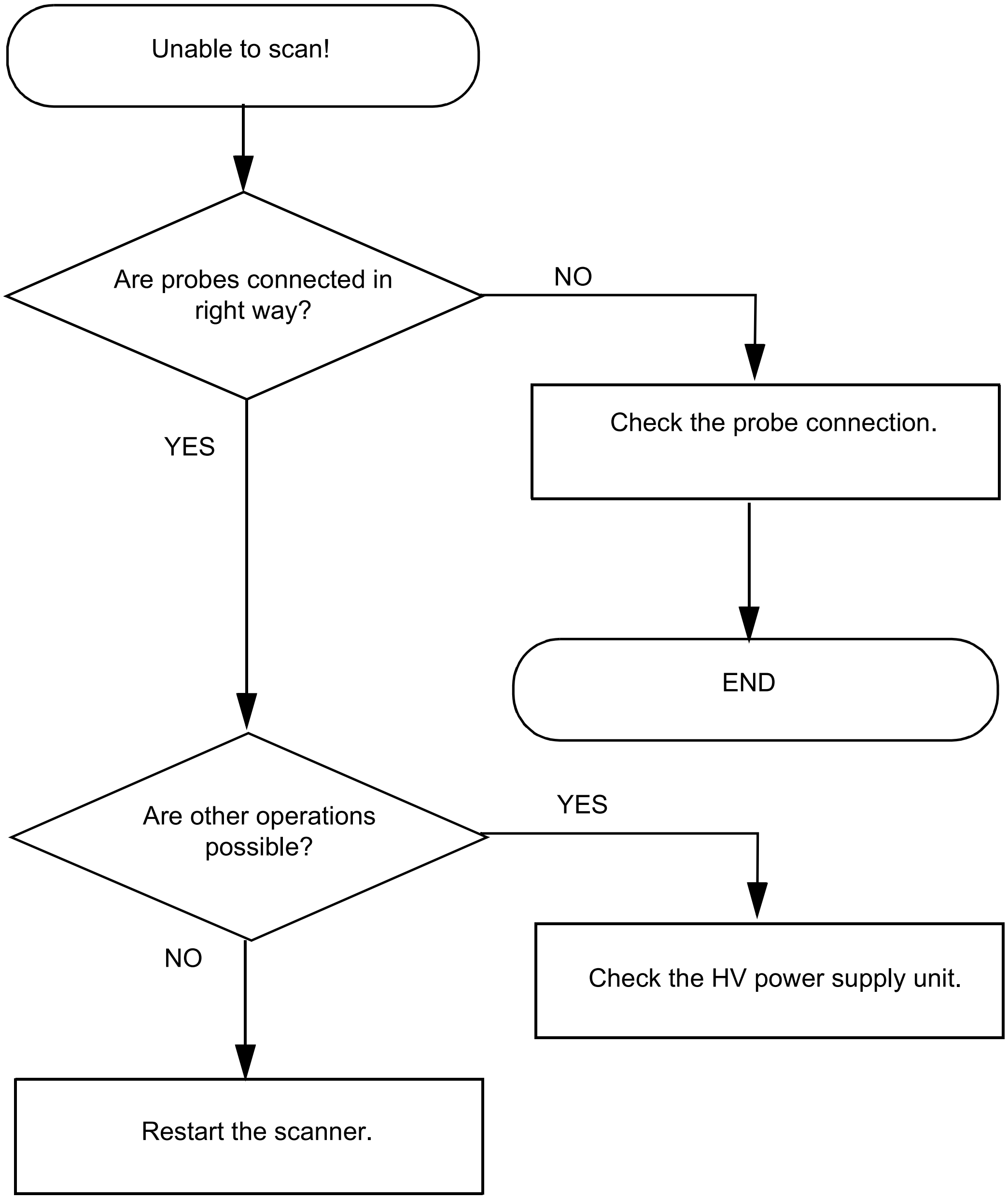

Unable to scan!
Are probes connected in right way?
NO
Check the probe connection.
END
YES
Are other operations possible?
YES
Check the HV power supply unit.
NO
Restart the scanner.

Figure 7-50 Unable to Scan

7-12-5 Trackball

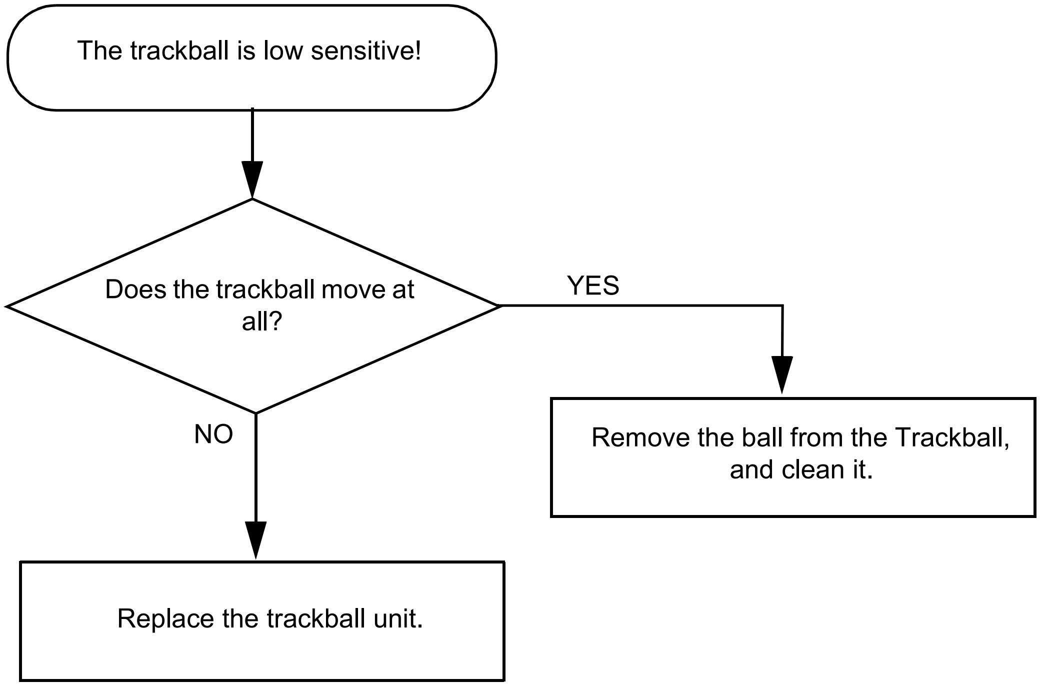

The trackball is low sensitive!
Does the trackball move at all?
YES
NO
Remove the ball from the Trackball, and clean it.
Replace the trackball unit.

Figure 7-51 Trackball Troubleshooting

7-12-6 Minimum Cable Configuration for System to Boot

The following cables must be connected between the INT I/O board and the rest of the system:

- Cables to Hard Disk (inside Back End Processor)
- Patient I/O cable to Patient I/O box
- I/O RS-232 serial cable to Front Panel
- ACCTRL cable between INT I/O and ACCTRL (power-on signal)
- DC Power cable to Front Panel
- Cables to the monitor

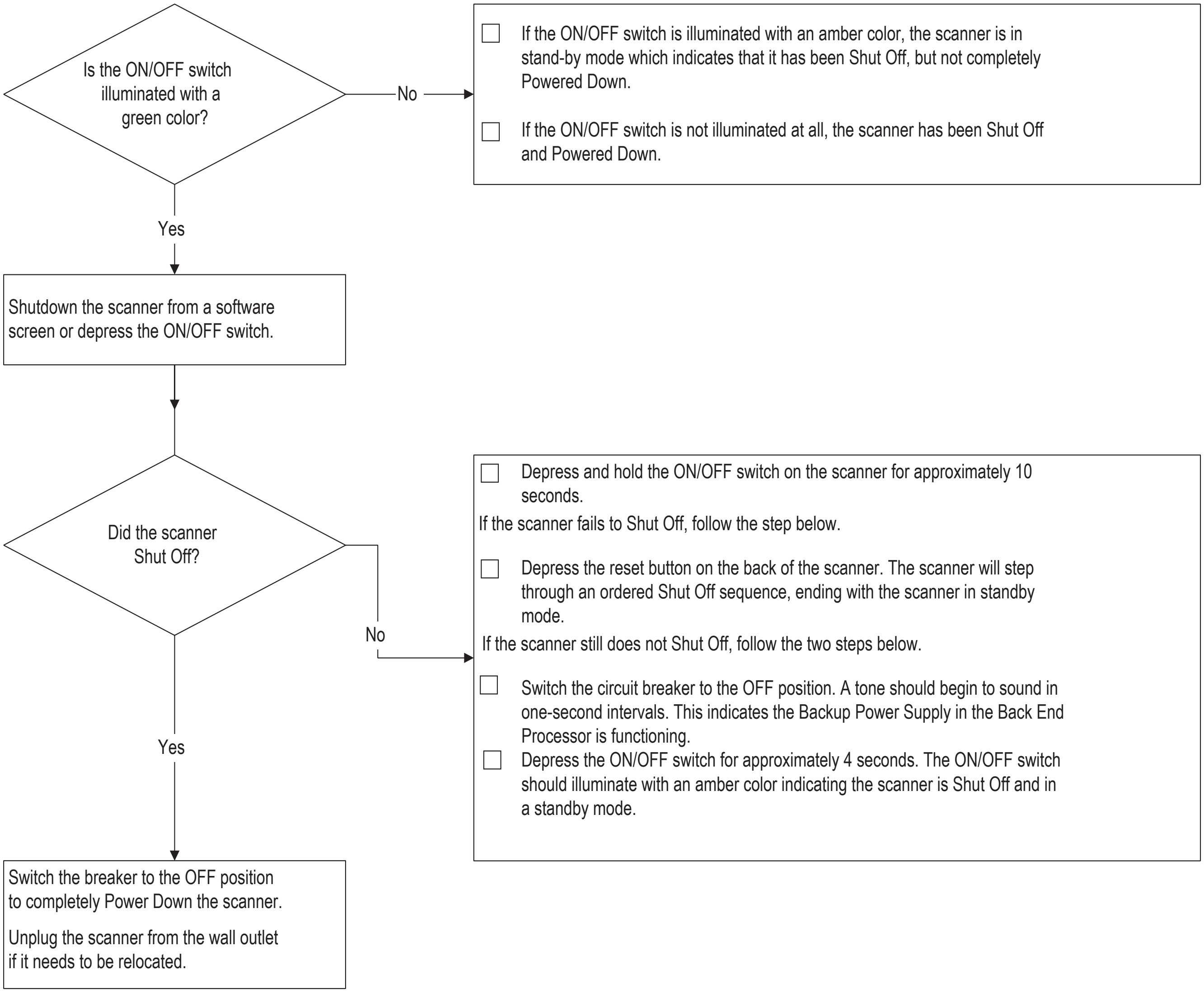
All other cables can be removed and the system will still boot.

7-12-7 Minimum Cable Configuration for System to Scan

The following cables must be connected between the INT I/O board and the rest of the system:

- Cables to Hard Disk (inside Back End Processor)
- Patient I/O cable to Patient I/O box
- I/O RS-232 serial cable to Front Panel
- ACCTRL cable between INT I/O and ACCTRL (power-on signal)
- DC Power cable to Front Panel
- Cables to the monitor
- PCI Cable from BEP to SCB

7-12-8 System Does Not Power Off / Shutdown


Is the ON/OFF switch illuminated with a green color?
No
Yes
Did the scanner Shut Off?
No
Yes

☐ If the ON/OFF switch is illuminated with an amber color, the scanner is in stand-by mode which indicates that it has been Shut Off, but not completely Powered Down.

☐ If the ON/OFF switch is not illuminated at all, the scanner has been Shut Off and Powered Down.

Shutdown the scanner from a software screen or depress the ON/OFF switch.

☐ Depress and hold the ON/OFF switch on the scanner for approximately 10 seconds.

If the scanner fails to Shut Off, follow the step below.

☐ Depress the reset button on the back of the scanner. The scanner will step through an ordered Shut Off sequence, ending with the scanner in standby mode.

If the scanner still does not Shut Off, follow the two steps below.

☐ Switch the circuit breaker to the OFF position. A tone should begin to sound in one-second intervals. This indicates the Backup Power Supply in the Back End Processor is functioning.

☐ Depress the ON/OFF switch for approximately 4 seconds. The ON/OFF switch should illuminate with an amber color indicating the scanner is Shut Off and in a standby mode.

Switch the breaker to the OFF position to completely Power Down the scanner.

Unplug the scanner from the wall outlet if it needs to be relocated.

Figure 7-52 Power Off / Shutdown Flowchart

7-12-9 Monitor Troubleshooting

NOTE: Reset the monitor settings to the factory defaults prior to troubleshooting the monitor.

⚠ **NOTICE** Comments to remember about the 17” monitor.

The monitor is the diagnostic monitor and is only connected to 115 VAC.

The monitor powers down with the front end card rack.

Power output from AC Control Box:

When the monitor is not connected to the AC Control Box there is a leakage current which when measured with a DVM can indicate high voltage.

When a load is applied, the voltage collapses to low voltage if the monitor is not switched on.

7-12-9Monitor Troubleshooting (cont'd)

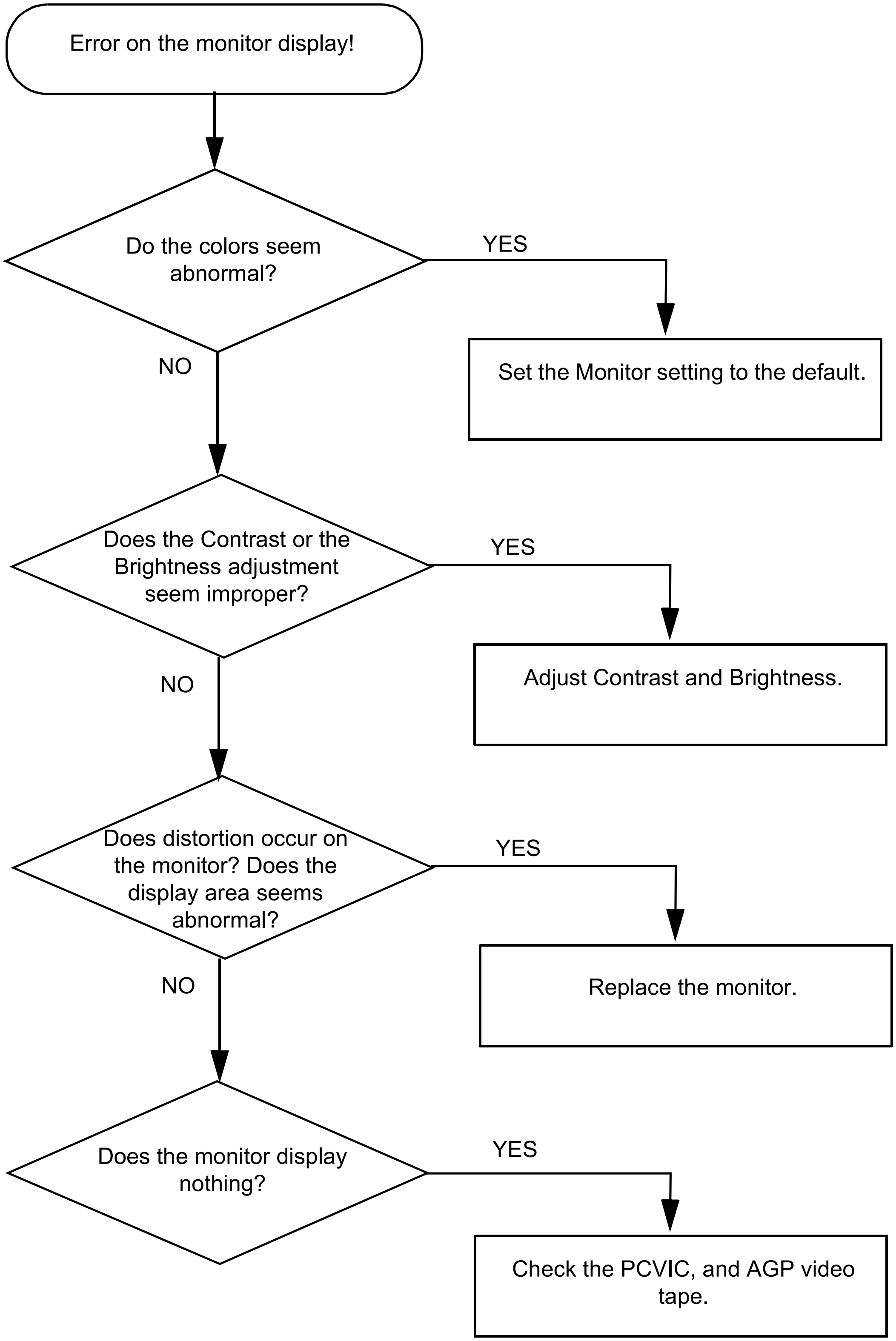

Error on the monitor display!
Do the colors seem abnormal?
YES
Set the Monitor setting to the default.
NO
Does the Contrast or the Brightness adjustment seem improper?
YES
Adjust Contrast and Brightness.
NO
Does distortion occur on the monitor? Does the display area seems abnormal?
YES
Replace the monitor.
NO
Does the monitor display nothing?
YES
Check the PCVIC, and AGP video tape.

Figure 7-53

7-12-9Monitor Troubleshooting (cont'd)

- Monitor does not work
  - Check AC circuit breaker
  - Verify power is present at monitor outlet
  - Check if video is present at backplane
- Colored streaks appear in image
  - Check for presence of magnetic sources near the monitor
  - Eliminate the sources and then degauss the monitor
  - The monitor should automatically degauss itself each time power is applied if you wait at least 10 seconds before you turn power back ON
- Prints do not match monitor
  - Verify factory default settings. Chapter 18 in the User Manual calls out suggested settings for various exam and lighting conditions.
- Video test patterns are not clear, bright, parallel or square
  - Replace the monitor

7-12-10 Unable to Record to VCR

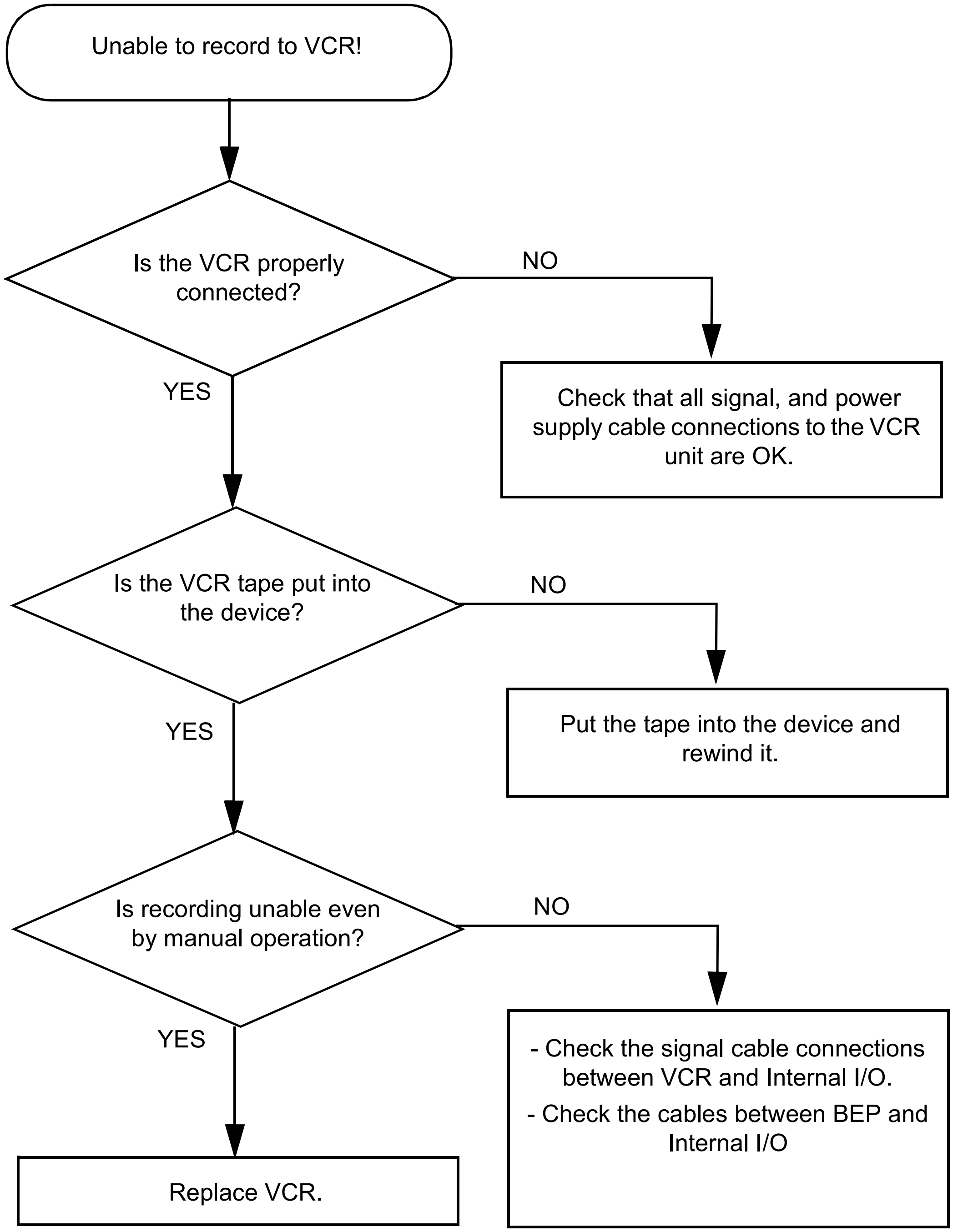

Unable to record to VCR!
Is the VCR properly connected?
NO
YES
Check that all signal, and power supply cable connections to the VCR unit are OK.
Is the VCR tape put into the device?
NO
YES
Put the tape into the device and rewind it.
Is recording unable even by manual operation?
NO
YES
- Check the signal cable connections between VCR and Internal I/O.
- Check the cables between BEP and Internal I/O
Replace VCR.

Figure 7-54 VCR Troubleshooting

7-12-11 Printer Troubleshooting

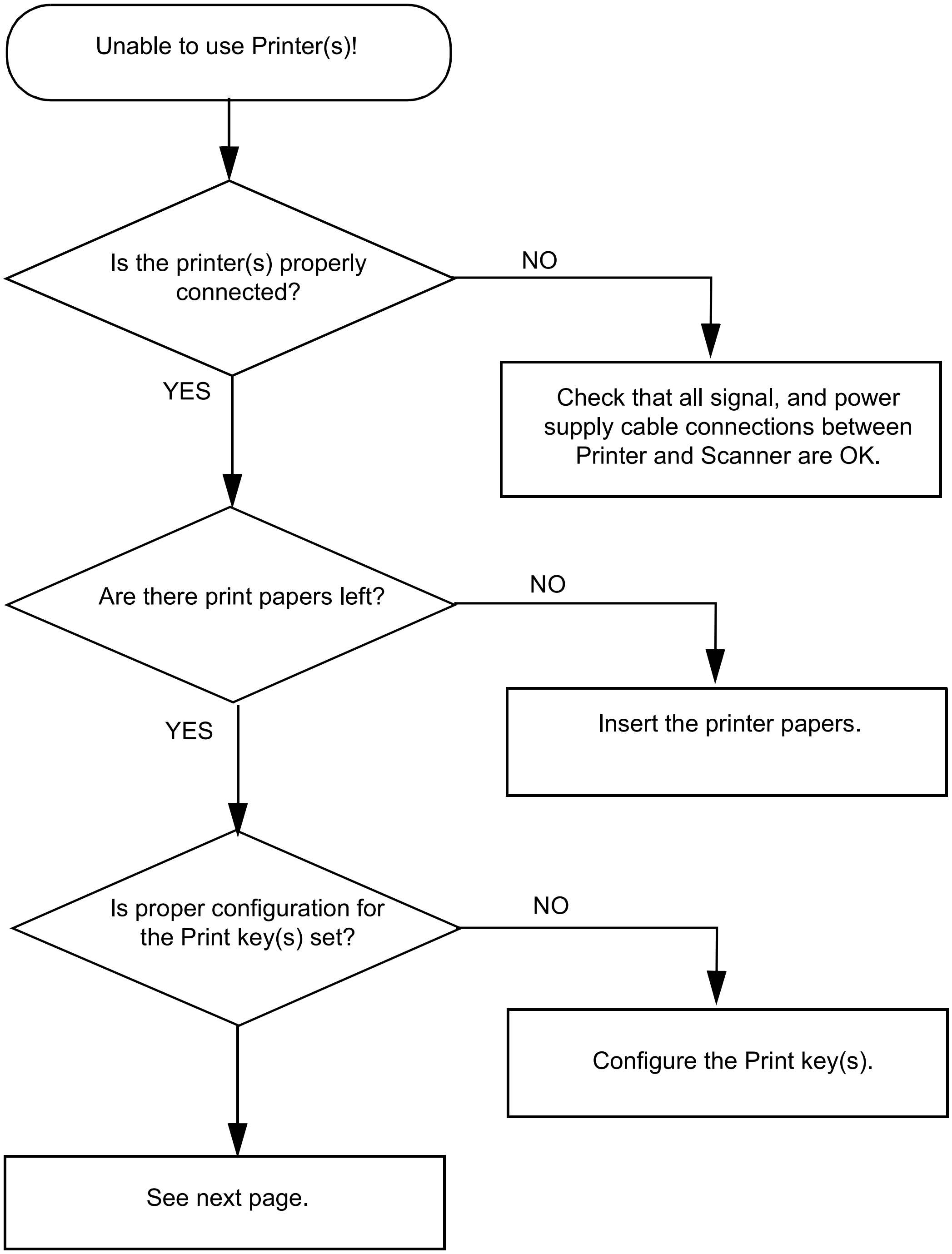

Unable to use Printer(s)!
Is the printer(s) properly connected?
NO
Check that all signal, and power supply cable connections between Printer and Scanner are OK.
YES
Are there print papers left?
NO
Insert the printer papers.
YES
Is proper configuration for the Print key(s) set?
NO
Configure the Print key(s).
See next page.

Figure 7-55 Printer Troubleshooting

7-12-11Printer Troubleshooting (cont'd)

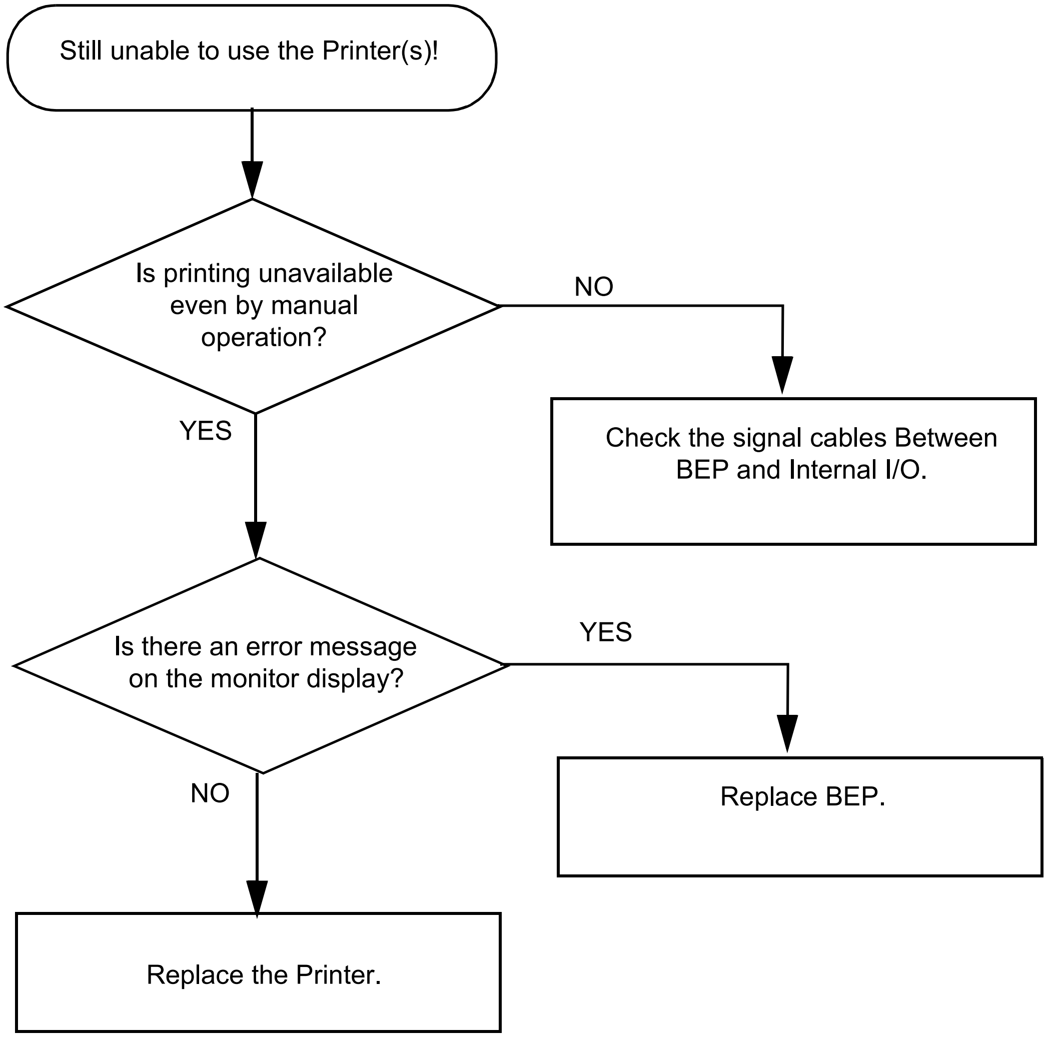

Still unable to use the Printer(s)!
Is printing unavailable even by manual operation?
NO
Check the signal cables Between BEP and Internal I/O.
YES
Is there an error message on the monitor display?
YES
Replace BEP.
NO
Replace the Printer.

Figure 7-56 Printer Troubleshooting (contd.)

7-12-12 CD-RW Troubleshooting

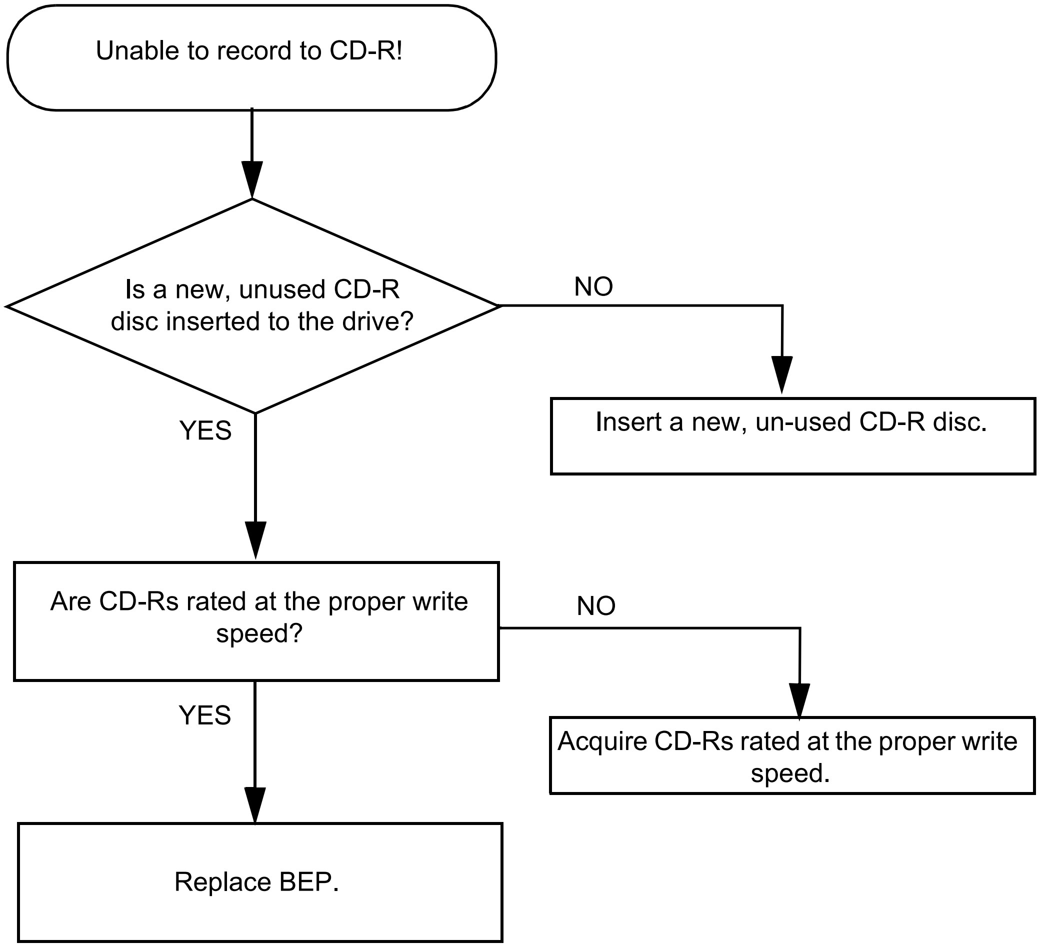

Unable to record to CD-R!
Is a new, unused CD-R disc inserted to the drive?
NO
Insert a new, un-used CD-R disc.
YES
Are CD-Rs rated at the proper write speed?
NO
Acquire CD-Rs rated at the proper write speed.
YES
Replace BEP.

Figure 7-57 CD-RW Troubleshooting

7-12-13 MOD Troubleshooting

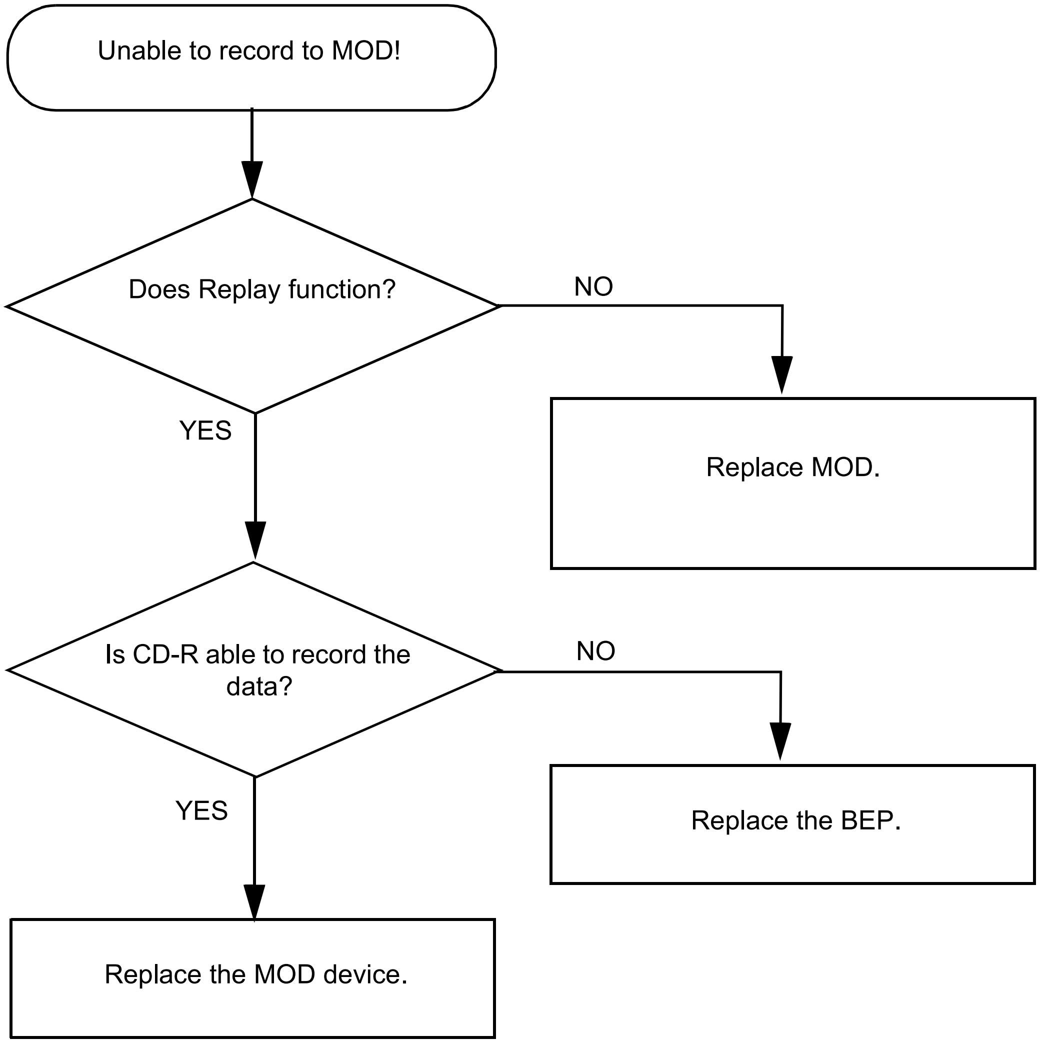


Figure 7-58

7-12-14 Network Troubleshooting

7-12-14-1 No Connection to the Network at All

1.) Check that the network cable between the scanner and the wall network is connected and well seated in both ends.
2.) Try a network cable that is known to be OK.
3.) Check the cable between the Back End Processor and Internal I/O.
4.) Connect a Crossed network cable between the Scanner and your PC. Try to ping from the scanner to the IP address on the PC. If OK, the hardware connection inside the scanner is OK.

7-12-14-2 No Contact With Server, But Connection to Network is OK

Check Network setup on the scanner.

7-12-14Network Troubleshooting (cont'd)

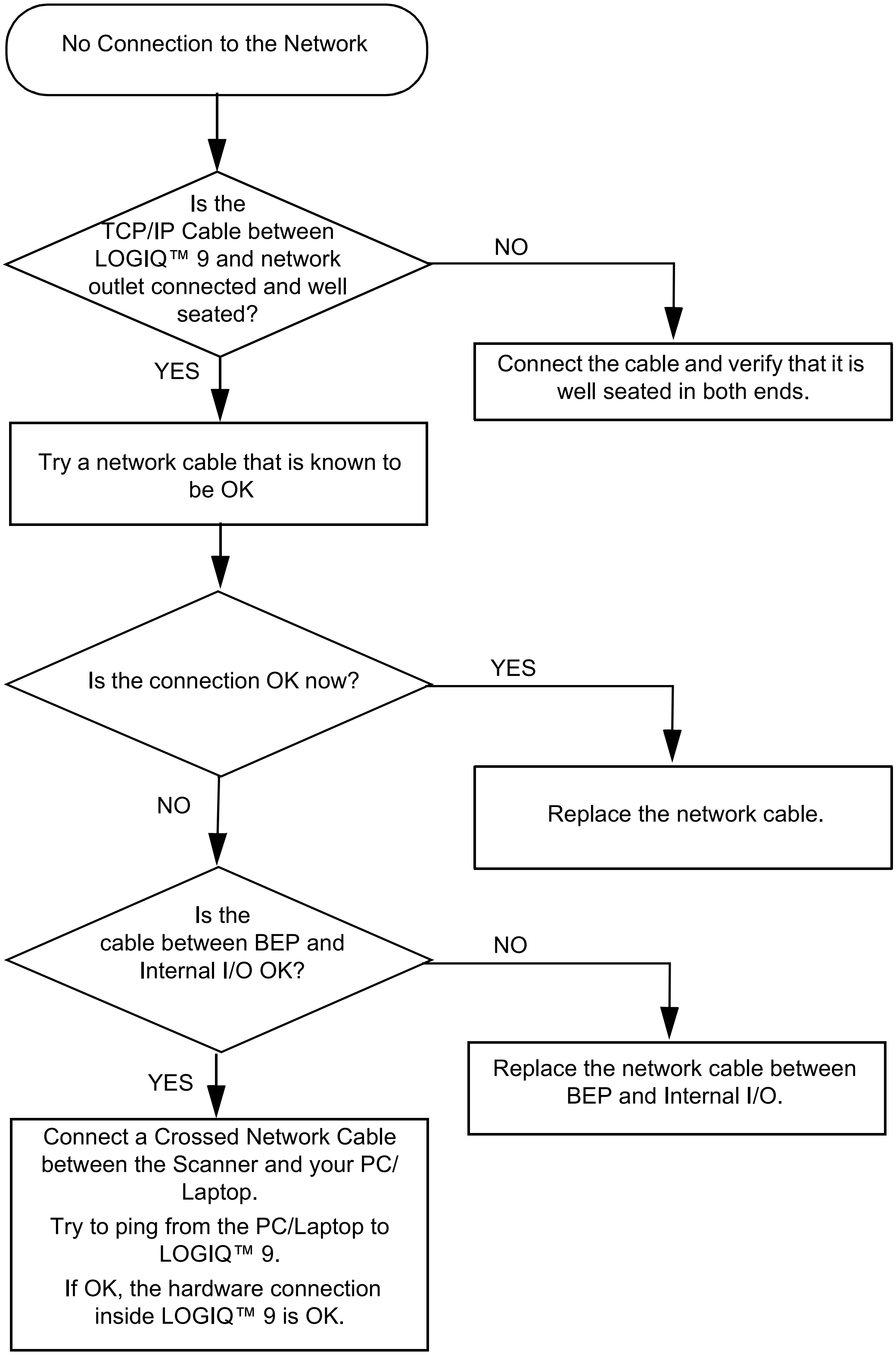

No Connection to the Network
Is the TCP/IP Cable between LOGIQ™ 9 and network outlet connected and well seated?
NO
Connect the cable and verify that it is well seated in both ends.
YES
Try a network cable that is known to be OK
Is the connection OK now?
YES
Replace the network cable.
NO
Is the cable between BEP and Internal I/O OK?
NO
Replace the network cable between BEP and Internal I/O.
YES
Connect a Crossed Network Cable between the Scanner and your PC/ Laptop.
Try to ping from the PC/Laptop to LOGIQ™ 9.
If OK, the hardware connection inside LOGIQ™ 9 is OK.

Figure 7-59

Section 7-13
Troubleshooting TiPs

Use Troubleshooting TiPs Table 7-3 on page 71 to access the troubleshooting TiPs listed. Each entry in the table will hyper-link to the issue and resolution

Table 7-3 Troubleshooting TiPs Table

Sub-System	Issue
Power Supply	Noise on FEPS Fans
	HV Errors
No Boot	System Will Not Boot
Image Artifacts	Image Arifacts Caused by Front End Boards
Connectivity	No Ping
	No Verify
	System pings and verifies but doesn’t send
Back End Processor	System halt errors – Lock ups or intermittent problems
	Drive failures (CD or MOD)
	Video problems on main monitor
	Simulator mode
Operator Panel	No Audio
	No remote control for peripherals
	No video on LCD display
	Wrong key activated on the Touch panel
	Touch panel not responding
I^{2}C Buss	

7-13-1 Soft Keys

There are several Soft keys to be utilized on the LOGIQ™ 9:

- **Alt + F4** = Shut Down
- **Alt + F10** = is the SW Shut Down.

  This is very important tool to shut-down the system. If there is something problem with the I^2C bus you can shut-down the system by using this Alt + F10 keys. If the systems can easily be shut-down by using these keys it means that SW is working fine so the problem could be the I^2C bus, ON/OFF switch or the wire that carriers shut-down signal.
- **Alt +F5** or **F11** for the echo simulator.

7-13-2 Power Supply

7-13-2-1 Noise on FEPS Fans

- Check the part number of your FEPS. It should be 2260203 Rev H or Rev J. If not, the site may be eligible for FMI 70168 ***(Part Number 2340861)***
- Replace the power supply.

7-13-2-2 HV Errors

- HV faults will show up whenever the TD boards have HV out of specification. Check FEPS voltages. You can visually check the LED status on the FEPS and on EQ (for HV). If any of the Power supplies is missing, there will not be HV output. If this is the case the Power Supply needs to be replaced.
- Run Diagnostics on the Power Supply to check the voltages and their tolerances. Refer to 7-7-4-8 "System-Level Analog Diagnostics" on page 7-29***.*** It will show you all the voltages including the Pulser HV (~ +120V) and HVP (+100V) and HVN (-100V). Pulser HV is generated on the FEPS and goes straight to the TD boards; HVN and HVP are generated on the EQ board from the Pulser HV. If HVN and/or HVP are the only ones missing, replace the EQ board. If Pulser HV is missing, replace FEPS.
- Remember that Pulser HV won’t be present if you don’t have any probe connected.

NOTE: *You may find older power supplies that have a –15V supply. This power supply is not used on the system; newer FEPS don’t even have it present.*

7-13-3 No Boot

Check status of the ON/OFF button.

- If green, perform a hard shutdown by holding the button down until it becomes amber. If the system was not properly shut down it won't boot up until the Back End Processor (BEP) is forced to shut down.

If amber, troubleshoot BEP Minimum configuration. Refer to 7-12-1 "System Does Not Power On / Boot Up" on page 7-50

  - Basically you need to disconnect the PC2IP cable from the back of the BEP to isolate the Front End and see if that keeps the system from booting up. The Back End Processor will boot up in simulator mode, which would indicate that the problem is in the Front End. Check the LEDs on the FEPS. Check all the voltages out of the FEPS with a scope. If any of the LEDs is not green or the measured voltage is not within specs, replace FEPS.
  - Also, try disconnecting the USB ports from the back of the BEP and reboot. Sometimes USB devices draw too much current from the BEP motherboard and will keep it from booting up. If the system boots up with no USB connections, perform a forced shutdown (you don't have access to the OP Panel at this point) and reconnect everything to see if the system boots up normally. If it doesn't, troubleshoot the USB devices such as the OP panel and Line printers.
  - If the minimum configuration does not allow the computer to boot up, the problem must be in the BEP itself. Replace Back End Processor. This is a known problem with the BEP power supply. There is an FMI that will be coming out to address this. Until then the BEP is replaced.

- If not lit, troubleshoot AC distribution box.
  - Check AC power on the system inlet and verify that the circuit breaker is in the ON position.
  - Check the FEPS fans. When the L9 unit is plugged into AC and the circuit breaker is ON, 1) the FEPS fan is running, and 2) there is a +5V standby coming from the BEP that turns on the amber light of the ON/OFF LED on the top panel. If neither of these can be observed, replace the AC Distribution box. If the fan is running, but the +5V standby is absent, replace BEP.
  - Check the AC output going to the modem, monitor and peripherals. They should be activated when the system is powered on.
  - Check the AC power going into the BEP. If you don't hear any clicking when trying to boot up, it is probably that the relays inside the AC distribution box are not being activated. Replace AC distribution box.

7-13-4 Image Artifacts

Image artifacts can be caused by any of the boards on the Front End. Artifacts are frequently due to the Front End Power supply or TD board failures. It is important to use the Diagnostic tools on the service interface to try to narrow down the failure to one or two boards. On Logiq 9 the “loop back” adapter is not necessary.

- Check FEPS voltages. You can visually check the LED status on the FEPS. If any of the leds are not lit, the power supply is defective. Run Diagnostics on the Power Supply to check the voltages and the tolerance. Check them with a scope as well look for possible high ripple. If this is the case, replace the FEPS.
- M12L Mux In Handle probe has shown some artifacts that look like a dark vertical line or lines that start at the bottom of the image. If this is the case, replace M12L probe. Refer to ***Service Note 70303*** for more details about this problem.
- Artifacts that look like white vertical lines, rain or snow cones in one or more areas of the image can be troubleshot in different ways:
  - One troubleshooting technique is to swap TDs around to see if the artifact moves. (Pulling out the boards will keep the system from booting up; all the boards must be present for the system to operate)
  - Another approach is to run the Visual Channel Utility to establish which channel the artifact affects. A channel is a signal path formed by XDIF, RF, Top Panel and TD board. Any of these boards in the path can be causing the failure. For instructions about troubleshooting Diagnostics, refer to 7-7-4-4 "Board Level EBM Diagnostics" on page 7-26***.***
  - Be aware that the problem may only appear with one mode, probe or preset. Normally, in B-Flow the problem becomes more evident and may be easier to troubleshoot.
  - Check all the probes on all the ports. Remove all the probes, and then check each probe singly in every port.
    - If port-related, replace Connector board.
    - If the artifact only occurs with one probe, replace probe.
    - If the problem persists with the new probe, reload software. Do not reload presets until you have tested the system with the default settings and be sure that the problem does not persist. User Defined Presets can carry corruption back to the system.

7-13-4Image Artifacts (cont'd)

- If you suspect that the problem may be caused by software corruption, please note: Corrupt Presets can be identified by a problem in only one exam category using a specific probe, or a particular mode with a specific probe. Use the Clean Userdef function under Scanner Utilities, leaving the system with only the factory defaults. Be sure to back up the presets, including Connectivity configuration, TCP/IP page and Option strings before deleting the User defined files. Do NOT reload presets until you have tested the system.
    * Before performing Clean User Defs function perform an Alt-D to capture the logs and preset files. If the problem is corrected with Clean User Defs send in the log to the OLC so that the corrupted preset files can be reviewed.
    * After booting up the system, without starting any patient or accessing any menu, click on the Service Interface (Wrench Icon) and log in. Click on Utilities, then on Scanner utilities and then on "Clean User Defs". Say OK and that will clean the folder. Shutdown the system immediately, using the System Shutdown function under Scanner Utilities. After rebooting, the system will come up with default settings. Only reload presets from disk if you are sure they were stored before the corruption occurred. If only Imaging Presets are affected you can restore the Connectivity presets by using the selective Restore function.

7-13-5 Connectivity

7-13-5-1 No Ping

- Check the speed of your connection. Follow ***Service Note 70302*** to be sure Media Type is set for Auto Select. Remember that every time the system is re-ghosted, that setting goes back to the default value.
- Check cables. You need a cross over cable if you are connected directly to the device. Use a straight cable whenever you go through a hub. The use of a hub is highly recommended.
- Try connecting the network cable directly to the Ethernet port in the back of the BEP. If the connection works, troubleshoot the cabling to the external I/O.
- Check proper addressing. System should be under the same subnet or have a gateway address to be able to connect to another subnet.
- Check with your laptop if you can ping the Logiq 9 and the device (Printer or PACs).

7-13-5-2 No Verify

- Check if the device supports Verify.
- Check port and AE title info.
- Check if device is up and running. It may be up but in an error status. Reboot the device if possible. You also may need to reboot the LOGIQ™ 9.
- Use DICOM Doctor to evaluate errors in the communication.
- Clean User Defs before reloading software in case there is a corrupt Connectivity.res file. Be sure to do an Alt-D to capture logs before performing a Clean User Defs so that if the presets prove corrupt the logs can be sent to OLC for Engineering to review.
- Reload software.

7-13-5-3 System Pings and Verifies but does NOT Send

- Check if device is up and running. It may be up but in an error status. Reboot the device if possible. You also may need to reboot the Logiq 9.
- Check device configuration.
- Clean the spooler (F4). If the jobs in the spooler cannot be deleted, you need to do it in Windows. These jobs may be corrupted or may be using a lot of space in the disk and cause problems sending Dicom images. Insert the Service Dongle, turn the system on and log in into maintenance and exit to Windows (the application should not be running). Then go to Windows Explorer and look for the file C:\musashi\target\jobqueue.res. Delete the file.
- Check Connectivity configuration on the Logiq 9.
    - If it is a printer, check that the printer supports the film type and format. Some printers don’t support different image sizes (or different formats, such as the Patient entry screen). If this is the case, the spooler may show the job in a “Done” status but the images never get printed. Try sending secondary capture.
    - If it is a storage device, check if the type of image selected is supported (color, gray, Multiframe)
    - If it is a Worklist broker, you must use a Dataflow in which your Worklist is the primary input. Otherwise it won’t let you retrieve patients. Also check your Worklist search criteria configuration. ***Refer to User Manual (Chapter 16).***
- Use DICOM Doctor to evaluate errors in the communication.
- Clean User Defs before reloading software in case there is a corrupt Connectivity.res file. Be sure to do an Alt-D to capture logs before performing a Clean User Defs so that if the presets prove corrupt the logs can be sent to OLC for Engineering to review.
- Reload software.

7-13-6 Back End Processor

7-13-6-1 How to differentiate BEP1 and BEP2.X easily

- If the MOD is 640M it should be BEP1.
- If the MOD is 1.3G it should be BEP2.X.

7-13-6-2 System Halt Errors - Lock ups or Intermittent Problems

- Collect error Logs and send them to the OLC to be evaluated. Refer to 7-3-3 "Collect a Trouble Image with Logs" on page 7-3 It is extremely important to give as much detail as possible about the occurrence of the problem and the date and time it showed up. On the scan screen, press ALT-D. Reload software.

7-13-6-3 Drive Failures (CD or MOD)

- Check that the media (disk capacity and speed) is supported.
    - For the CD, there are 3 different speeds. Drives are listed like this: **24x10x40x**. The first number (**24x**) indicates what speed the drive can write to a CD-R disc (write speed only). The second number (**10x**) indicates what speed the drive can write to a CD-W (write & re-writes many times). The last number (**40x**) indicates how fast the drive can read a CD. You only need to check the first number (typically 24 or 16) since we only use CD-R discs. The capacity is normally 700MB.
    - For the MOD, the size is 3.5 inches, 230, 540 or 640 MB. The 230 MB disc is the most commonly used.
- Check Windows for driver issues. Go to Control Panel > Administrative tools> Computer management> Device Manager.
- Re-install drivers if necessary.
- If the CD drive is having problems, replace BEP.
- If MOD drive is having problems, try reloading software.
- If the problem persists, replace BEP.

7-13-6-4 Video Problems on the Main Monitor

- If the problem appears on the main monitor and it involves the whole screen, not only the image area, check your peripherals.
    - If present on the peripherals, replace BEP.
    - If not present on the peripherals, move the connector D4 (SVGA out to the top monitor) on the BEP rear panel to the C13. That connects the monitor directly to the SVGA port. If the problem is still present, replace Monitor. If not, replace BEP.

7-13-6-5 Simulator Mode

- Check the connection of the PC2IP cable on both the SCB board and BEP.
- Check the part number on the SCB board. It should be 2260214-2 or 2260214-3. The revisions with earlier (lower) numbers had issues with the PCI connector. The connector on the board had intermittent contact on the 2260214 boards. If the SCB has an older revision, order FMI 70168
- Check FEPS. You can visually check the LED status on the FEPS. If any of the voltages is missing, replace FEPS.

7-13-7 Operator Panel

7-13-7-1 No Audio

- Check volume settings in the application and also in Windows.
- Use headphones, (the type that you use on a personal CD player or a laptop) to test the audio output directly from the back of the BEP.
    - If no Audio is present on the BEP, Reload software. If the problem persists, replace the BEP.
    - If Audio is present, follow the audio signal to the VCR or the OP Panel (the audio amplifier is located in the upper OP panel). The Audio output from the BEP goes to the Internal I/O and from there to the VCR and OP Assembly (use an adapter to plug the headphones to the RCA outputs of the Internal I/O). See Section 5-5 "Operator Console Control PWA" on page 5-31. If Audio outputs are working, replace Upper OP Assembly. Otherwise replace Internal I/O board.
    - Always measure the speakers' impedance; it should measure approximately 7 ohms. If Speakers are bad, it is possible that the amplifier on the Upper OP Assembly might be defective, too.

7-13-7-2 No Remote Control for Peripherals

- Check cable connections.
- Check configuration of the device.
- Clean User Defs before reloading software in case there is a corrupt Connectivity.res file. Be sure to do an Alt-D to capture logs before performing a Clean User Defs so that if the presets prove corrupt the logs can be sent to OLC for Engineering to review.
- Reload software*.*
- Replace the device.

7-13-7-3 No Video on LCD Display

- If the video is too dim, has dimmed areas or there is no video at all, replace the HV LCD inverter.
- If the HV LCD inverter is burnt, there is a possibility that the Digital Video Card on the PC also got damaged; in that case you also have to order the Back End Processor.
- Replace upper panel assembly.

7-13-7-4 Wrong Key Activated on the Touch Panel

- Perform Touch Screen Verification Utility, check first before calibrating. See section 7-7-4-10 "Calibration Utilities" on page 7-34. Access the Service interface (Click on the Wrench) and go to Diagnostics > Acquisition diagnostics > Diagnostics groups > Calibration Utilities > Start Touch Screen Verification.
- Calibrate touch panel. See section 7-7-4-10 "Calibration Utilities" on page 7-34. Access the Service interface (Click on the Wrench) and go to Diagnostics > Acquisition diagnostics > Diagnostics groups > calibration utilities > Touch panel calibration
- Replace Upper Panel Assembly.

7-13-7-5 Touch Panel Not Responding

- Perform Touch Screen Verification Utility, check first before calibrating. See section 7-7-4-10 "Calibration Utilities" on page 7-34. Access the Service interface (Click on the Wrench) and go to Diagnostics > Acquisition Diagnostics > Diagnostics Groups > Calibration Utilities > Start Touch Screen Verification.
- Calibrate touch panel. See section 7-7-4-10 "Calibration Utilities" on page 7-34. Access the Service interface (Click on the Wrench) and go to Diagnostics > Acquisition Diagnostics > Diagnostics Groups > Calibration utilities > Touch Panel Calibration.
- Reload software*.*
- Replace Upper Panel Assembly.

7-13-8 Probes

7-13-8-1 Probe Recognition

- Check all the probes on all the ports. Remove all the probes, and then check each probe singly in every port.
  - If the problems persist with all the probes, replace the XDIF board.
  - If only one probe fails to be recognized, clean User Defs to check if the problem is caused by corrupted presets. If the problem is not resolved, replace the probe.

7-13-9 I^2C Buss

I^2C is a clock and data bus. I^2C control is embedded in the master chip i960 RP. The LOGIQ™ 9 contains four separate I^2C buses. The first bus is located in the BEP:

- BEP PC2IP->PC/DGIO->IIO->EIO
- PC/DGVIC
- Patient I/O

One of the basic functions of this bus is carrying Start-up/Shut-down sequence for the LOGIQ™ 9. It also carries control signals for the PRINT keys. If the PRINT keys function fine to PRINT on a B/W printer or color printer but the Stand-by switch does not work to shut-down the system, I2C bus should be functioning normal but the ON/OFF switch itself (pinched cable or bad sticky button) could cause the problem.

The other three I^2C buses are located in the front end:

- EQ/EBM->RFAmp->XDIFF->Transducer (For E8C temp. sensing)
- EQ/EBM->TDs (Serial EEPROM for the VPD

  Each TD board has an Analog Devices A/D converter with an I^2C interface on it for diagnostics. The converter reads transmit Vref (variable, 0-2V), the fixed A/D converter Vref, and has a built-in temperature sensor. Diagnostics reads back all of these over the I^2C bus; the I^2C master is on the EQ board.
- EQ/EBM->Back Plane->Power Supply (Fan speed and temperature control, +5, +3.3, +-6 V, +12, ProBias 120 V, Probe Rail +-100V)

These I^2C buses in the front-end card cage are for controlling the voltage on the TD boards, temperature control and FEPS fan control.

There is no classical type of sensor for temperature in the LOGIQ™ 9 Card Cage. There is an integrated circuit for the temperature sensing that is located on the Front End boards including TDs and EQ/EBM board.

A/D diagnostic goes through on the I^2C bus on the TDs. PCI bus is used for the communication between the EBM/EQ, SCB and BEP. Since there is no PCI bus on the TD, XDIFF, RF and Back Plane, I^2C bus goes through these boards from the EQ board.

NOTE: The ultrasound data for beamforming is transferred to the next TD boards through the Back Plane. I^2C buses never carry any ultrasound data!

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Chapter 8
Replacement Procedures

Section 8-1
Overview

8-1-1 Purpose of Chapter 8

This chapter contains replacement procedures for different modules and their subsystems.

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8-1-2 Returning/Shipping Probes and Repair Parts

Equipment being returned must be clean and free of blood and other infectious substances.

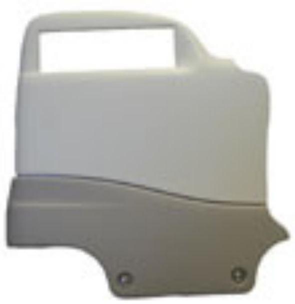
GEMS policy states that body fluids must be properly removed from any part or equipment prior to shipment. GEMS employees, as well as customers, are responsible for ensuring that parts/equipment have been properly decontaminated prior to shipment. Under no circumstance should a part or equipment with visible body fluids be taken or shipped from a clinic or site (for example, body coils or an ultrasound probe). The purpose of the regulation is to protect employees in the transportation industry, as well as the people who will receive or open this package.

NOTE: The US Department of Transportation (DOT) has ruled that “items that were saturated and/or dripping with human blood that are now caked with dried blood; or which were used or intended for use in patient care” are “regulated medical waste” for transportation purposes and must be transported as a hazardous material.

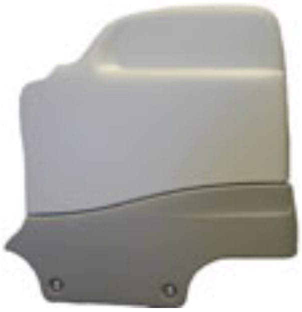
Section 8-2
Plastic Covers and Bumpers

8-2-1 Overview of Covers and Bumpers

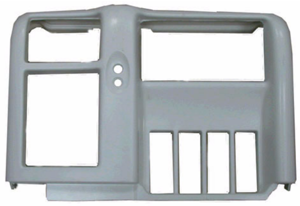
Table 8-2



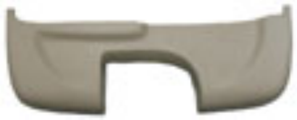
LEFT-SIDE COVER



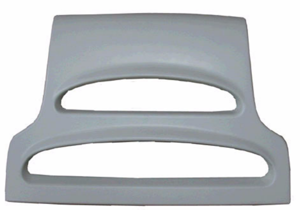
RIGHT-SIDE COVER



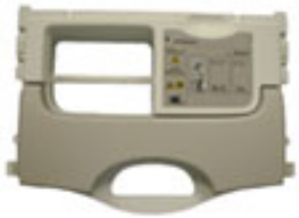
FRONT COVER



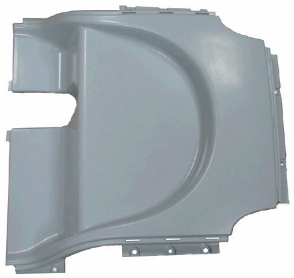
FRONT BUMPER



UPPER REAR COVER



LOWER REAR COVER



TOP COVER

Click on the movie camera icon to view the video of the Cover removal. 2 minutes and 33 seconds

8-2-2 Side Covers (with Bumper) Replacement Procedure

Select the movie camera icon to view the video of the Cover removal procedure.

8-2-2-1 Manpower

One person, 5 minutes

8-2-2-2 Tools

Large coin and a large screwdriver

8-2-2-3 Preparations

Power Off / Shutdown the system as described in Section 4-3-2 on page 4-3.

8-2-2-4 Side Cover Removal Procedure

1.) Use a large coin to turn the two recessed fasteners at the bottom of the side cover a quarter turn to the horizontal position.

2.) Take hold under the lower front side of cover and pull out gently. At the same time support the rear side of the cover with the other hand.

NOTE: The two fasteners hold the left-side cover to the scanner at the bottom of the card cage cover.
The two fasteners hold the right-side cover to the scanner at the bottom of the AC power supply wall.

3.) When the cover is loose in front, pull the rear out and move upwards.

4.) Lift the side cover gently upwards until the three hooks at the top of the side cover are free from the three retainer slots in the top cover as shown in Figure 8-1.

5.) To Remove Left side cover, repeat this procedure.

NOTE: Figure 8-1 shows the right-side cover being removed. Repeat the same steps listed above to remove the left-side cover.

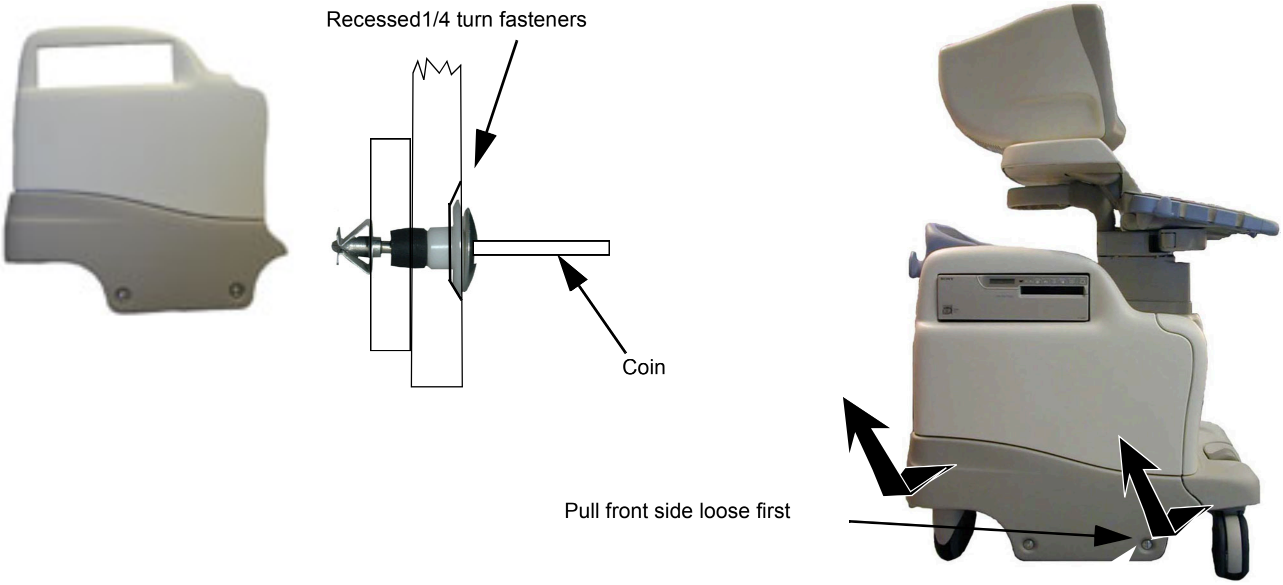


Figure 8-1 Removal of Side Covers

8-2-2-5 Side Cover Installation Procedure

(click here to view the cover installation video)

1.) Guide the top edge of the side cover so the hooks rest in the top cover retainer slots.

2.) Push back side in first position so it is locked in Lower Rear Cover.

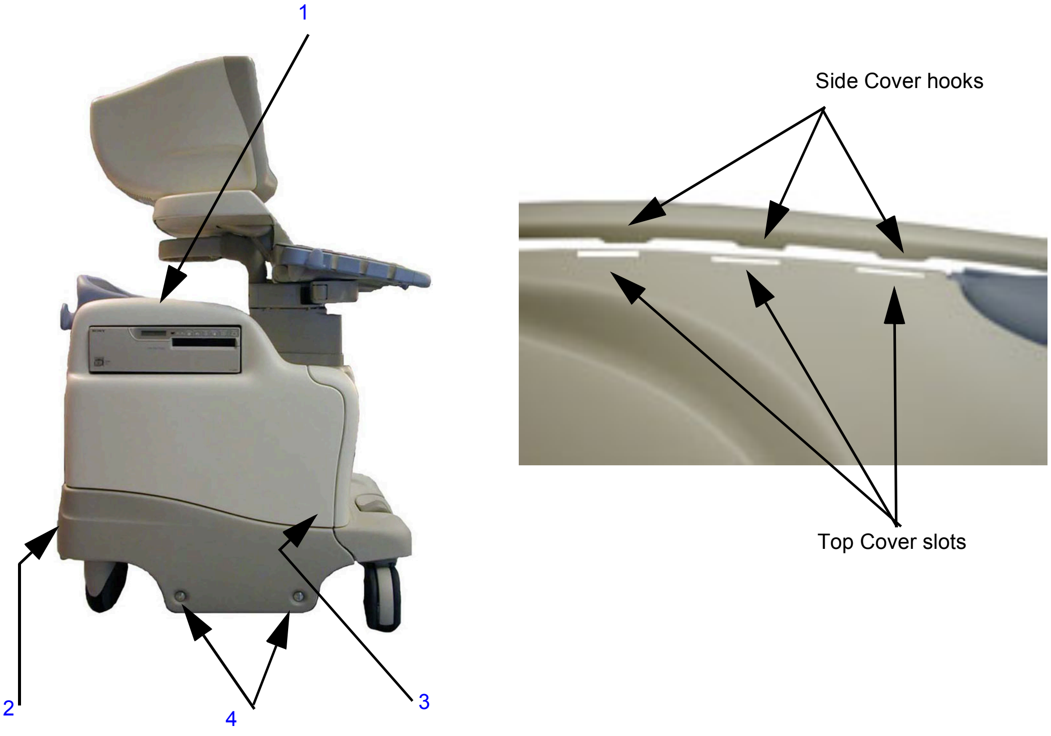


Figure 8-2 Installation of Side Covers

3.) Push the front side in position so it is locked in Front Cover.

4.) With a large coin, turn the two bottom fasteners to the vertical position.Now, using a large screwdriver, push in on these fasteners to lock them in place.

5.) If required, Power On/Boot-up the system as described in Power On / Boot Up on page 4-2.

8-2-3 Upper Rear Cover Replacement Procedure

Select the movie camera icon to view the video of the Cover removal procedure.

8-2-3-1 Manpower

One Person, 10 minutes

8-2-3-2 Tools

Phillips screwdriver

8-2-3-3 Preparations

Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3.

8-2-3-4 Filter Cover Removal Procedure

Take hold of the bottom side of the Filter Cover. Push up, pull out and unhook it from the top side and remove it.

8-2-3-5 Filter Cover Installation Procedure

(click here to view the cover installation video)

Align the cover at the top side. Push in and down to secure it along the bottom.

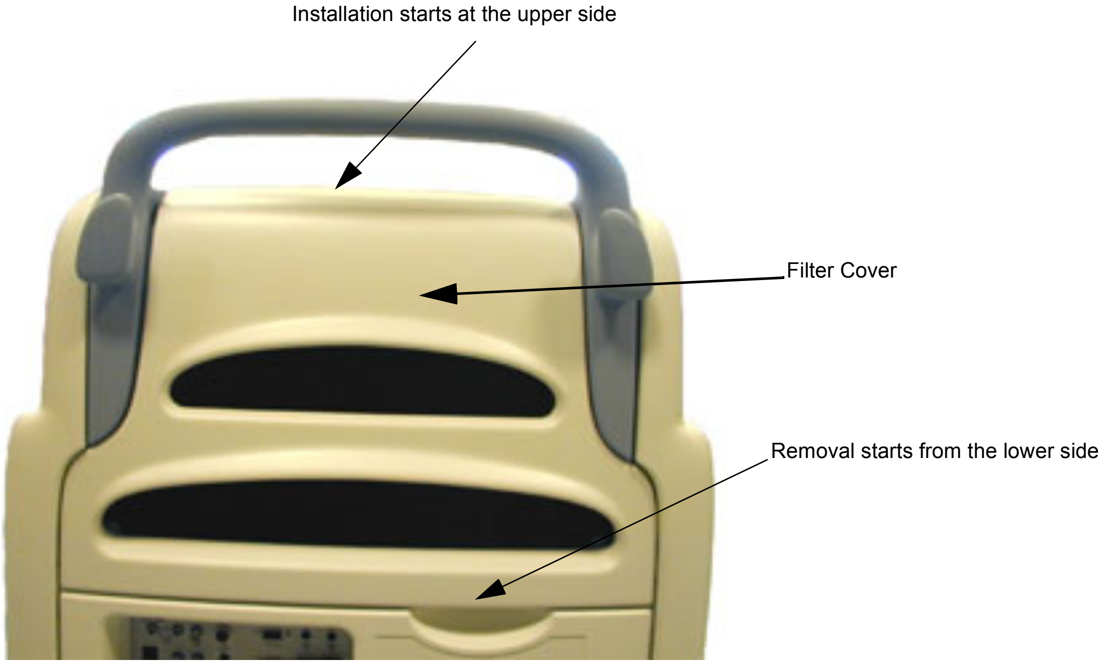

Installation starts at the upper side
Filter Cover
Removal starts from the lower side

Figure 8-3 Filter Cover

8-2-4 Top Cover Replacement Procedure

Select the movie camera icon to view the video of the Cover removal procedure.

8-2-4-1 Manpower

One person, 30 minutes

8-2-4-2 Tools

Phillips Screwdriver

8-2-4-3 Preparations

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3
2.) Remove both left- and right-side covers as described in Section 8-2-2-4 on page 8-5.
3.) Remove upper rear cover as described in Section 8-2-3 on page 8-7.

8-2-4-4 Removal Procedure

1.) Move the Operarttor I/O up and forwards to its end positions.
2.) Unscrew the 10 screws shown in Figure 8-4 on page 8-8 .
3.) Pull the cover gently backwards and upwards to free the cover from the hoist area and allow it to pass freely past the rear handle.
4.) Lift the top cover away from the scanner chassis.

8-2-4-5 Installation procedure

(click here to view the cover installation video)

1.) Position the top cover in place and fasten it with the 10 screws.
2.) Mount the side (Section 8-2-2 on page 8-5) and upper rear (Section 8-2-3 on page 8-7) covers.
3.) If required, Power On/Boot-up the system as described in Section 4-3-1 on page 4-2

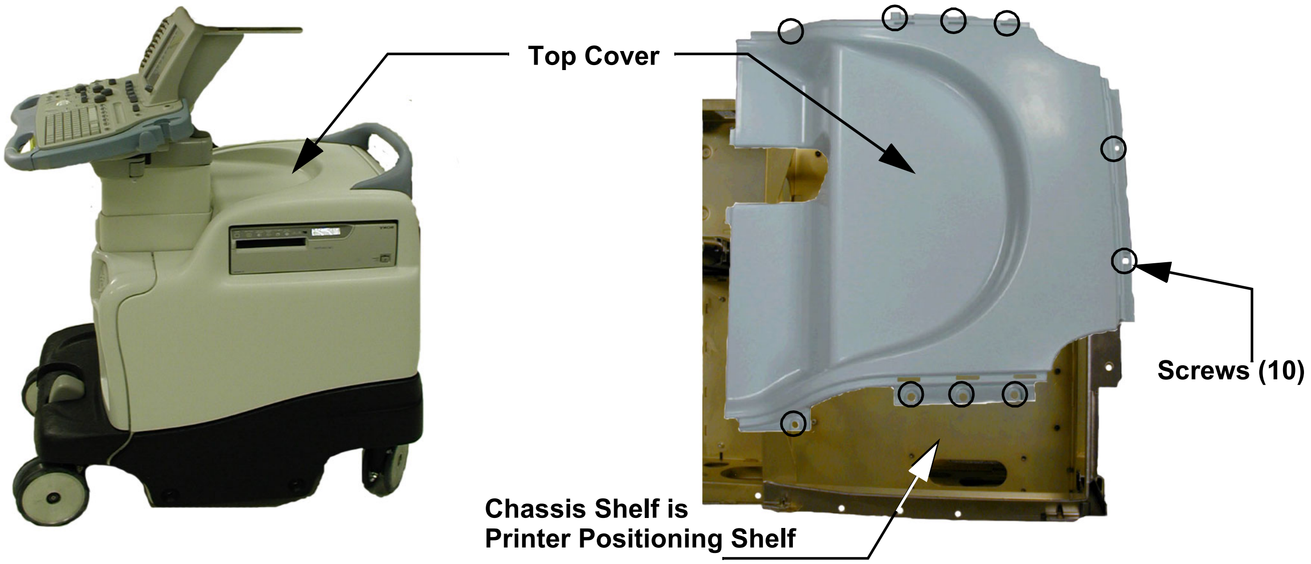


Figure 8-4 Top Cover

8-2-5 Front Cover Replacement Procedure

Select the movie camera icon to view the video of the Cover removal procedure.

8-2-5-1 Manpower

1 person, 20 minutes

8-2-5-2 Tools

Phillips Screwdriver

8-2-5-3 Preparations

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3.
2.) Disconnect all Probes and I/O cabling. See User manual.
3.) Remove left- and right-side covers as described in Section 8-2-2 on page 8-5.
4.) Remove any probes attached to the system.

8-2-5-4 Removal procedure

1.) Unscrew the 5 Phillips screws that fasten the front cover to the chassis.
2.) Pull it outwards to free it from the top cover and the front Bumper as shown in Figure 8-5.

8-2-5-5 Installation Procedure

(click here to view the cover installation video)

1.) Position the front cover so it fits between the chassis and the bumper as shown Figure 8-5.
2.) Position the front cover so it links together with the top cover. You may have to loosen the two Phillips screws on the top cover that are closest to the front cover.
3.) Fasten the front cover to the chassis with the five Phillips screws.
4.) Tighten the two Phillips screws in the top cover if they were loosened.
5.) Install the left- and right-side covers as described in Section 8-2-2 on page 8-5.

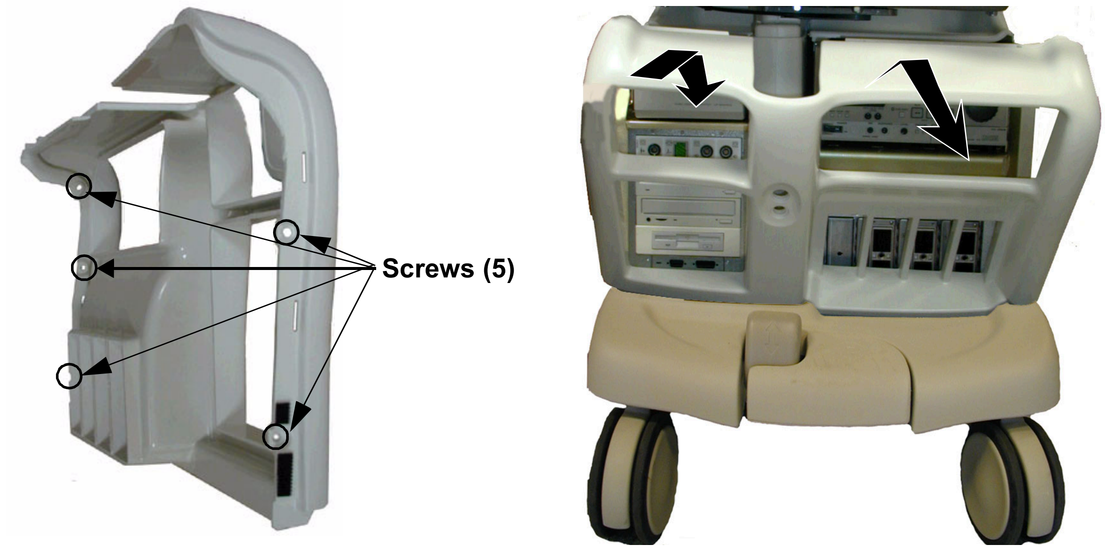


Figure 8-5 Removal/Installation of Front Cover

8-2-6 Lower Rear Cover Replacement Procedure

Select the movie camera icon to view the mpeg video of the Cover removal and replacement procedure.

8-2-6-1 Manpower

One person, 15 minutes

8-2-6-2 Tools

Phillips Screwdriver

8-2-6-3 Preparations

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3.
2.) Remove both left- and right-side covers as shown in Section 8-2-2 on page 8-5.
3.) Remove the upper rear cover as shown in Section 8-2-3 on page 8-7.

8-2-6-4 Lower Rear Removal Procedure

1.) Unscrew the six Phillips screws that fasten the lower rear cover to the chassis shown in Figure 8-6.

8-2-6-5 Lower Rear Cover Installation Procedure

(click here to view the cover installation video)

1.) Align the lower rear cover with the chassis and fasten it with the six Phillips screws.
2.) Install both left- and right-side covers as shown in Section 8-2-2 on page 8-5.
3.) Install the upper rear covers shown in Section 8-2-3 on page 8-7.
4.) If required, Power On/Boot-up the system as described in Section 4-3-1 on page 4-2.

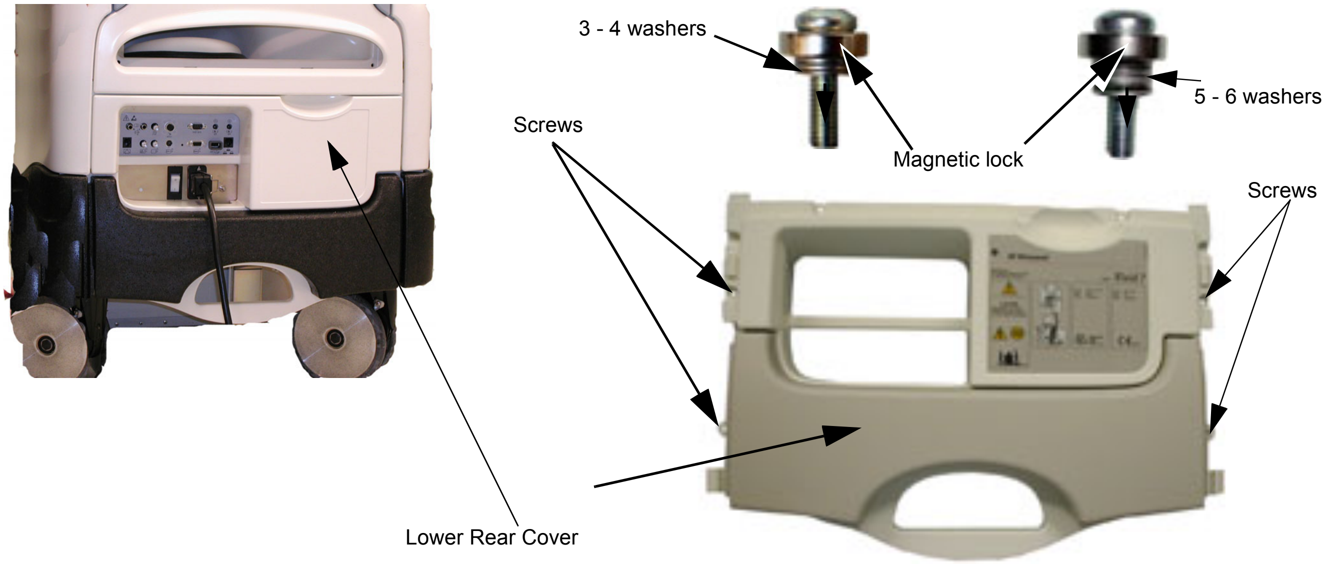


Figure 8-6 Lower Rear Cover with Bumper

8-2-7 Front Bumper Replacement Procedure

8-2-7-1 Manpower

One person, 30 minutes

8-2-7-2 Tools

Phillips size 2

Torx screwdriver T-20

8-2-7-3 Preparations

1.) Shut down the system as described in Section 4-3-2 on page 4-3.
2.) Remove Front Cover as described in Section 8-2-5 on page 8-9.

8-2-7-4 Front Bumper Removal Procedure

1.) Unscrew 4 Torx screws under the bumper.

2.) Lift the bumper off.

8-2-7-5 Front Bumper Installation Procedure

1.) Put the new bumper in position.

2.) Fasten the 4 screws firmly.

NOTE: *Do NOT overtighten these screws.*

3.) Install Front Cover as described in Section 8-2-5 on page 8-9. (click here to view the cover installation video)

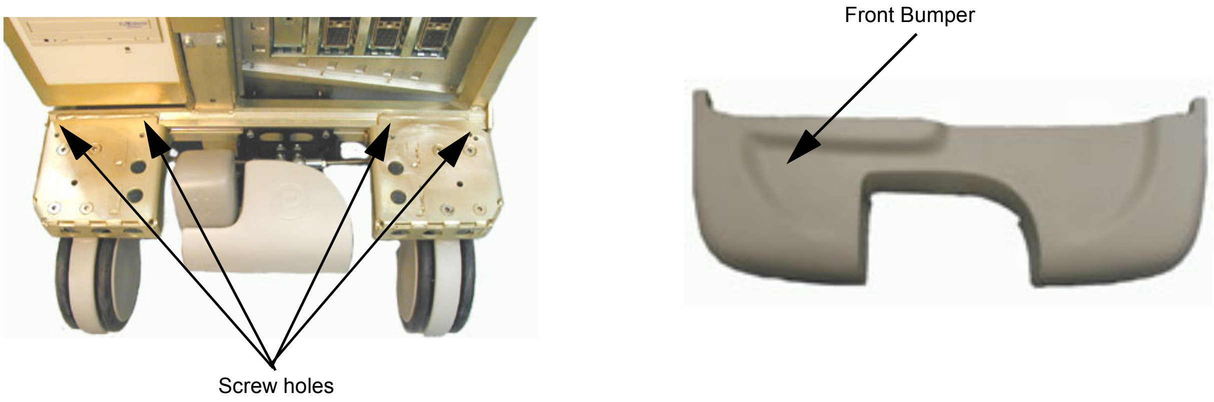


Figure 8-7 System Front Bumper

8-2-8 Rear Handle Replacement Procedure

8-2-8-1 Manpower

One person, 15 minutes

8-2-8-2 Tools

- Phillips screwdriver size 2
- Hexagon key 5 mm

8-2-8-3 Preparations

1.) Shut down the system as described in 4-3-2 "Power Off / Shutdown" on page 4-3.

2.) Remove Side Covers as described in Side Covers (with Bumper) Replacement Procedure on page 8-5.

3.) Remove Top Cover as described in Top Cover Replacement Procedure on page 8-8.

8-2-8-4 Rear Handle Removal procedure

1.) Remove the two (2) hex-screws on each side of Rear Handle (See Figure 8-8).

2.) Pull the handle upwards.

8-2-8-5 Rear Handle Installation procedure

1.) Push Rear Handle down its slides. Fasten four (4) hex-screws.

2.) Install Top Cover as described in Top Cover Replacement Procedure on page 8-8 and Side Covers as described in Side Covers (with Bumper) Replacement Procedure on page 8-5. (click here to view the cover installation video)

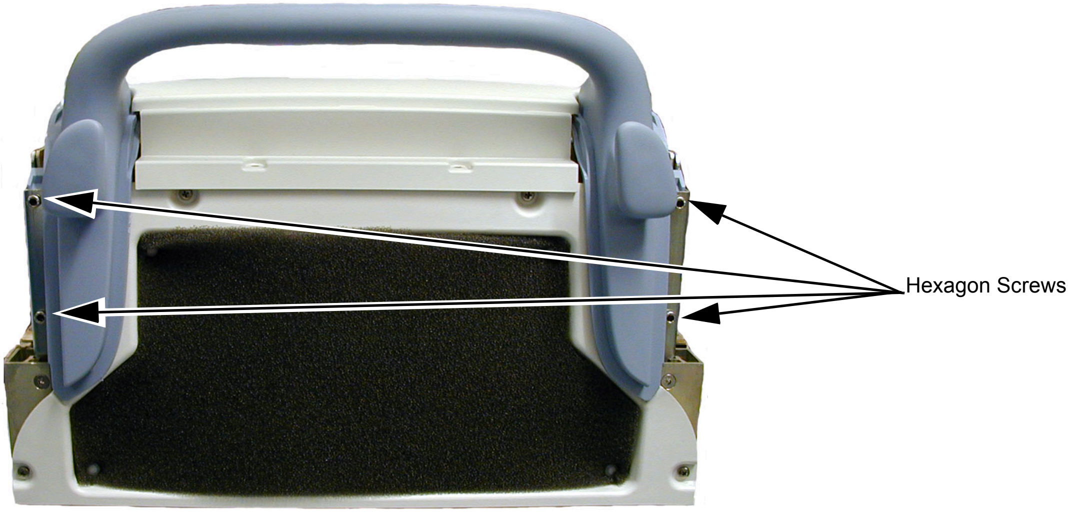


Figure 8-8 Rear Handle

Section 8-3
Back End Processor Replacement Procedure

Select the movie camera icon to view the video of the Back End Processor removal and replacement procedure.

3 minutes and 39 seconds

8-3-1 Manpower

One person, 0.5 hour + travel.

8-3-2 Tools

Long Phillips driver.

8-3-3 Preparations

(click here to view the cover removal video)

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3.
2.) Remove the left- and right-side covers as shown in Section 8-2-2 on page 8-5.
3.) Remove the upper rear cover as shown in Section 8-2-3 on page 8-7.
4.) Remove the lower rear cover as shown in Section 8-2-6 on page 8-10.

It is essential that Vital Product Data (VPD) is verified or updated after changing the Back End Processor. Refer to Section 8-35 "Verify and Update Vital Product Data" on page 8-135 for details.

NOTE: *Vital Product Data (VPD) must be verified and/or updated when the Back End Processor is replaced. Failure to properly program Vital Product Data could cause adverse affects on system operation and image quality.*

For the Back End Processor, remove the system left side cover and read the label on the front of the processor. The Part Number is there. The Functional Revision is the PSP# (number) on the label. Get the date for the BEP from this BEP rating plate. All other dates are taken from the Console rating plate.

This Vital Product Data for the BEP is stored on the FEP Backplane.

Table 8-3 BEP VPD Data

Circuit Board Name	Part Number	Functional Revision PWA Letter	Fab Revision PWB Number	Bar Code or Serial Number	Date YYYYMMDD
BEP	BEP Rating Plate	PSP Revison	N/A	No Dash Allowed	BEP Rating Plate 2 0 0 _ _ _ 01

8-3-4 Back-End Processor Removal Procedure

1.) Remove cables from the back of the Back-end Processor. As you remove each cable, ensure they are properly marked. See Table 8-4 or Table 8-5 for cable identification.

2.) Loosen and remove the 6 fastening screws (4 at rear of processor, 2 at front) holding the processor to the frame. Refer to Figure 8-9.

3.) Pull the Back-end Processor backwards and angle it to the outside to remove it from the frame.

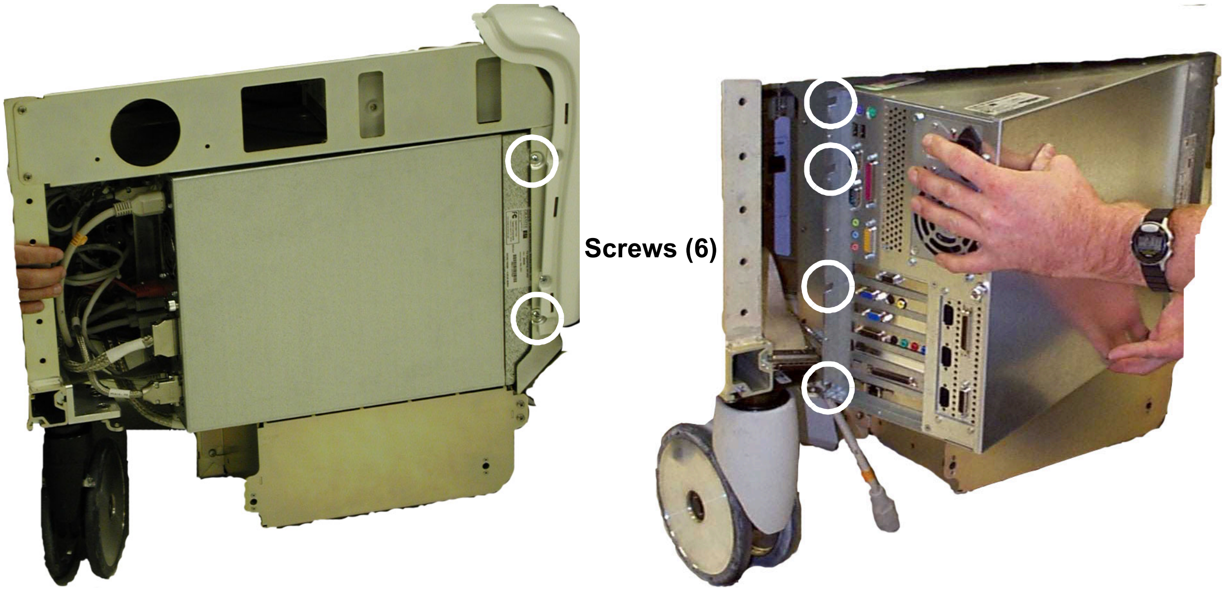


Figure 8-9 Removing / Installing the Back-end Processor

8-3-5 Back-End Processor Installation Procedure

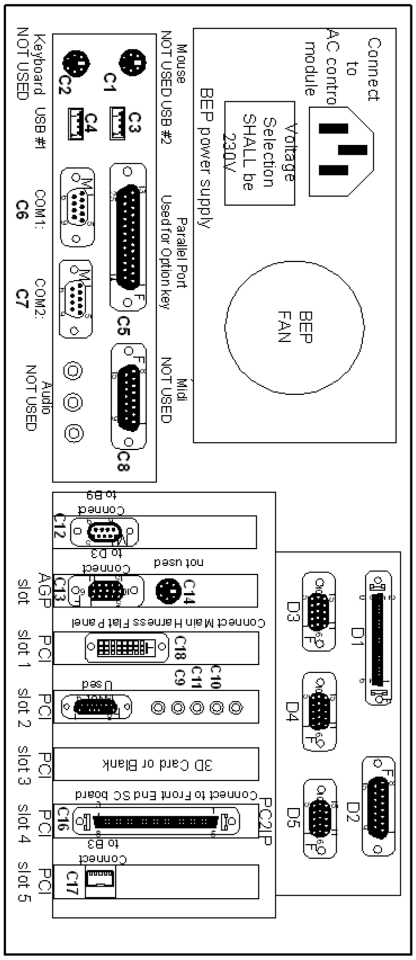
⚠ **CAUTION** **These mechanical parts may have sharp edges. Take care when holding these parts so you do not scratch or cut your skin.**

⚠ **NOTICE** Be careful to not pinch any of the cables.

1.) Slide the Back End Processor front first into the frame. Notice it does not fit flush with the side frame.
2.) Fasten the 6 screws to secure the back-end processor to the frame.
3.) Plug in the cables. See Table 8-4 or Table 8-5 for cable identification.
4.) Install the lower rear cover as shown in Section 8-2-6 on page 8-10 (click here to view the cover installation video)
5.) Install the upper rear cover shown in Section 8-2-3 on page 8-7.
6.) Install both left- and right-side covers as shown in Section 8-2-2 on page 8-5.
7.) Refer to the Software Laoding procedures to install the proper Base Image Software and Applications software to the new BEP.
8.) If required, Power On/Boot-up the system as described in Section 4-3-1 on page 4-2.

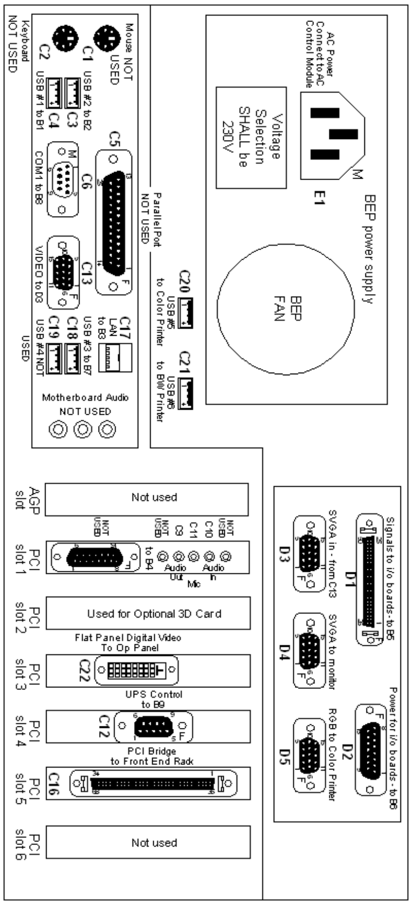
8-3-6 Back-End Processor Installation Procedure

Table 8-4 BEP1 (P3) Back-End Processor Cable Identification

	Number	Slot	Cable Function
 Connect to AC control module Voltage Selection SHALL be 230V BEP power supply BEP FAN Mouse NOT USED Keyboard NOT USED USB #1 USB #2 C1 C2 C3 C4 COM1: C6 COM2: C7 Parallel Port Used for Option key C5 Midi NOT USED Audio NOT USED C8 Connect to B9 C12 Connect to D3 not used C13 C14 AGP slot Connect Main Harness Flat Panel C18 PCI slot 1 C9 C10 C11 Used PCI slot 2 3D Card or Blank PCI slot 3 Connect to Front End SC board PC2IP C16 PCI slot 4 Connect to B3 C17 PCI slot 5 D1 D2 D3 D4 D5	C1 C2 C3 C4 C5 C6 C7 C8		Mouse - Not used. Keyboard - Not used. USB #1 USB #2 Parallel Port - Used for Options Dongle COM1 COM2 Joystick - Not used
	C18	PCI Slot 1	Flat Panel Video
		AGP Slot	Connect to PCVIC D3
	C9 C10 C11	PCI Slot 2	Audio Out to Internal I/O B4 (Green) Audio In to Internal I/O B4 (Blue) Microphone to Internal I/O B4 (Pink)
	C12	I/O Slot	Power Supply UPS control - Connect to Internal I/O B9
	C14	AGP Slot	Not used
		PCI Slot 3	Optional 3D Card
	C16	PCI Slot 4	PC2IP - Connect to Front End card rack SCB board
	C17	PCI Slot 5	Network Interface Card - Connect to Internal I/O B3
	D1 D2 D3 D4 D5	PC2IO PC2IO PCVIC PCVIC PCVIC	Signals to I/O boards to Internal I/O B5 Power to I/O boards to Internal I/O B6 SVGA in from Back-end Processor video board SVGA out to top console RGB out to color printer
	M	AC Power	Connect to AC control module

8-3-6 Back-End Processor Installation Procedure (cont'd)

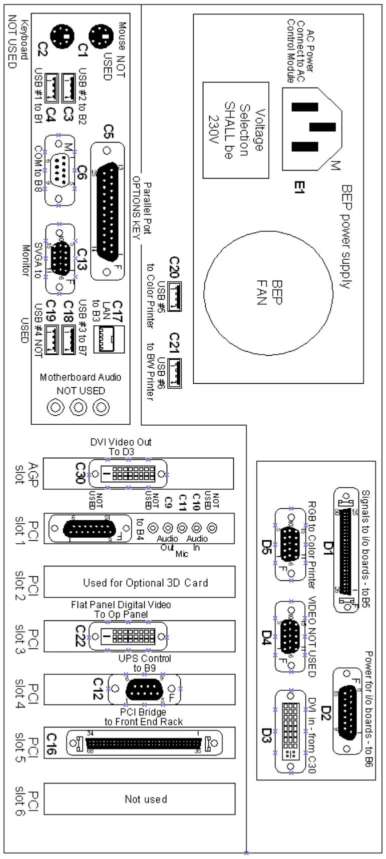
Table 8-5 BEP 2.0, BEP2.0.1 (P4) Back-End Processor Cable Identification

	Number	Slot	Cable Function
 Keyboard NOT USED Mouse NOT USED C1 C2 USB #2 to B2 USB #1 to B1 C3 C4 C5 C6 COM1 to B8 VIDEO to D3 C13 C17 LAN to B3 C18 USB #3 to B7 C19 USB #4 NOT USED Parallel Port NOT USED C20 USB #5 to Color Printer C21 USB #6 to B/W Printer Motherboard Audio NOT USED AC Power Connect to AC Control Module Voltage Selection SHALL be 230V E1 BEP power supply BEP FAN AGP slot Not used PCI slot 1 NOT USED C9 C11 C10 to B4 Audio Out Mic Audio In PCI slot 2 Used for Optional 3D Card Flat Panel Digital Video To Op Panel PCI slot 3 C22 UPS Control to B9 PCI slot 4 C12 PCI Bridge to Front End Rack PCI slot 5 C16 PCI slot 6 Not used D3 SVGA in - from C13 D1 Signals to i/o boards - to B5 D4 SVGA to monitor D5 RGB to Color Printer D2 Power for i/o boards - to B6	C1		Mouse - Not used.
	C2		Keyboard - Not used.
	C3		USB #2 to Internal I/O B2
	C4		USB #1 to Internal I/O B1
	C5		Parallel Port - Options Dongle
	C6		COM Port - Serial Port to Internal I/O B8
	C13		Video to D3 PCVIC Input
	C17		LAN to Internal I/O B3
	C18		USB #3 to Internal I/O B7 (use USB to serial converter)
	C19		USB #4 Not Used
	C20		USB #5 to Digital Color Printer
	C21		USB #6 to Digital B/W Printer
		AGP Slot	Not Used
	C9	PCI Slot 1	Audio Out to Internal I/O B4 (Green)
	C10	PCI Slot 1	Audio In to Internal I/O B4 (Blue)
	C11	PCI Slot 1	Microphone to Internal I/O B4 (Pink)
		PCI Slot 2	Optional 3D Card
	C22	PCI Slot 3	Flat Panel; Digital Video To OP Panel
	C12	PCI Slot 4	Power Supply UPS control - Connect to Internal I/O B9
	C16	PCI Slot 5	PCI Bridge to the Front End Card Rack
		PCI Slot 6	Not Used
	D1	PC2IO	Signals to I/O boards to Internal I/O B5
	D2	PC2IO	Power for I/O boards to Internal I/O B6
	D3	PCVIC	SVGA in from Back End Processor video board from C13
	D4	PCVIC	SVGA out to top console monitor
	D5	PCVIC	RGB out to color printer

NOTE: BEP2.0.1 is a BEP2.0 (PCVIC) that has been upgraded with the extra 256Mbyte memory. The connector configuration is the same.

8-3-6 Back-End Processor Installation Procedure (cont'd)

Table 8-6 BEP 2.1, BEP2.2 (P4) Back-End Processor Cable Identification

	Number	Slot	Cable Function
	C1		Mouse - Not used.
	C2		Keyboard - Not used.
	C3		USB #2 to Internal I/O B2
	C4		USB #1 to Internal I/O B1
	C5		Parallel Port - Options Dongle
	C6		COM Port - Serial Port to Internal I/O B8
	C13		Motherboard SVGA Video output to Monitot
	C17		LAN to Internal I/O B3
	C18		USB #3 to Internal I/O B7 (use USB to serial converter)
	C19		USB #4 Not Used
	C20		USB #5 to Digital Color Printer
	C21		USB #6 to Digital B/W Printer
	C30	AGP Slot	Digital Video to D3 DGVIC Input
	C9	PCI Slot 1	Audio Out to Internal I/O B4 (Green)
	C10	PCI Slot 1	Audio In to Internal I/O B4 (Blue)
	C11	PCI Slot 1	Microphone to Internal I/O B4 (Pink)
		PCI Slot 2	Optional 3D Card
	C22	PCI Slot 3	Flat Panel; Digital Video To OP Panel
	C12	PCI Slot 4	Power Supply UPS control - Connect to Internal I/O B9
	C16	PCI Slot 5	PCI Bridge to the Front End Card Rack
		PCI Slot 6	Not Used
	D1	DGIO	Signals to I/O boards to Internal I/O B5
	D2	DGIO	Power for I/O boards to Internal I/O B6
	D3	DGVIC	Digital Video in from BEP ADD video board - C30
	D4	DGVIC	SVGA Video output - Not Used
	D5	DGVIC	RGB out to color printer (not used with Digital Color Printer)

NOTE: A BEP 2.2 is the same as a BEP2.1 (DGVIC) with the extra 256MByte memory added. The connector configuration is the same.

Section 8-4
Back End Processor Power Supply Replacement

8-4-1 Manpower

One person, 1 hour + travel.

8-4-2 Tools

Long Phillips driver.

8-4-3 Preparations (click here to view the cover removal video)

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3.
2.) Remove the left- and/or right-side covers as shown in Section 8-2-2 on page 8-5.
3.) Remove the upper rear cover as shown in Section 8-2-3 on page 8-7.
4.) Remove the lower rear cover as shown in Section 8-2-6 on page 8-10.

8-4-4 Removing the BEP Power Supply

1.) Disconnect the power cord from the back of the Back End Processor (BEP).

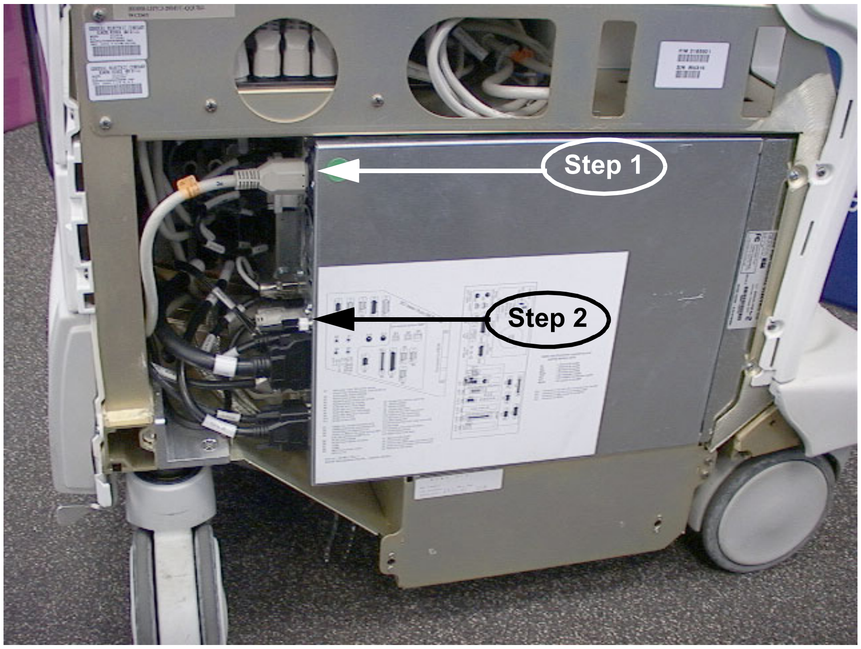


Figure 8-10 Power Cable and Cover Screw

2.) Remove the cover from the Back End Processor (BEP) by loosening the thumb screw on the back.

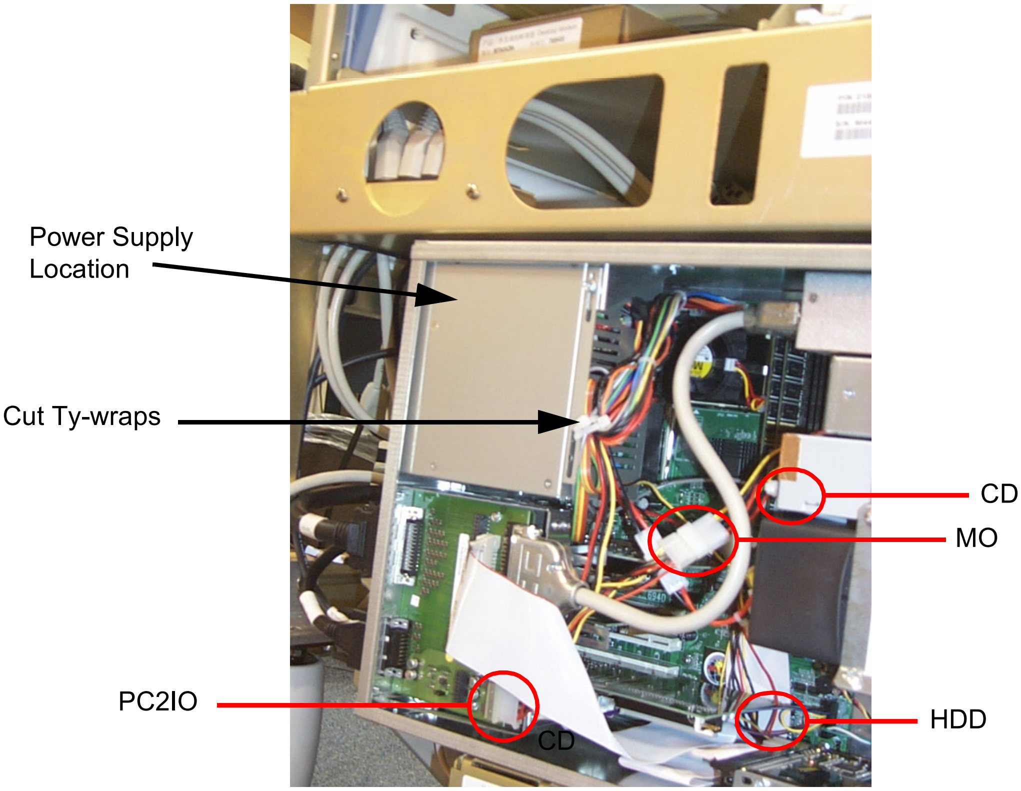


Figure 8-11 LOGIQ 9 Power Supply & Connector Locations

3.) Clip the ty-wraps holding the power supply cables to the side of the power supply.

4.) Mark both ends of the power connectors, as shown in Figure 8-11 on page 8-20 , on the power cables coming from the power supply to the:

- CD
- MO
- PC2IO
- HDD
- PCI Bird Card (If system has 3D option)

NOTE: *All five power connectors are exactly alike. They should be marked as a reference for cable routing purposes when the new power supply is installed.*

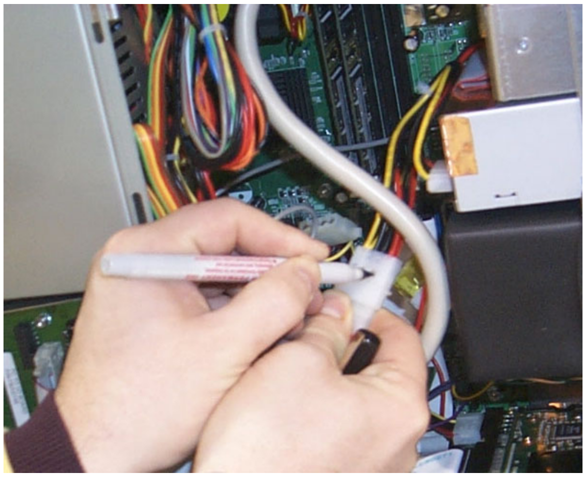


Figure 8-12 Mark Power Supply Connectors

5.) Disconnect the connector to the UPS Battery.

NOTE: Reconnecting the UPS Battery will cause a spark at the connector.

6.) Remove the two nuts holding the angle bracket, shown in Figure 8-13 on page 8-21 .

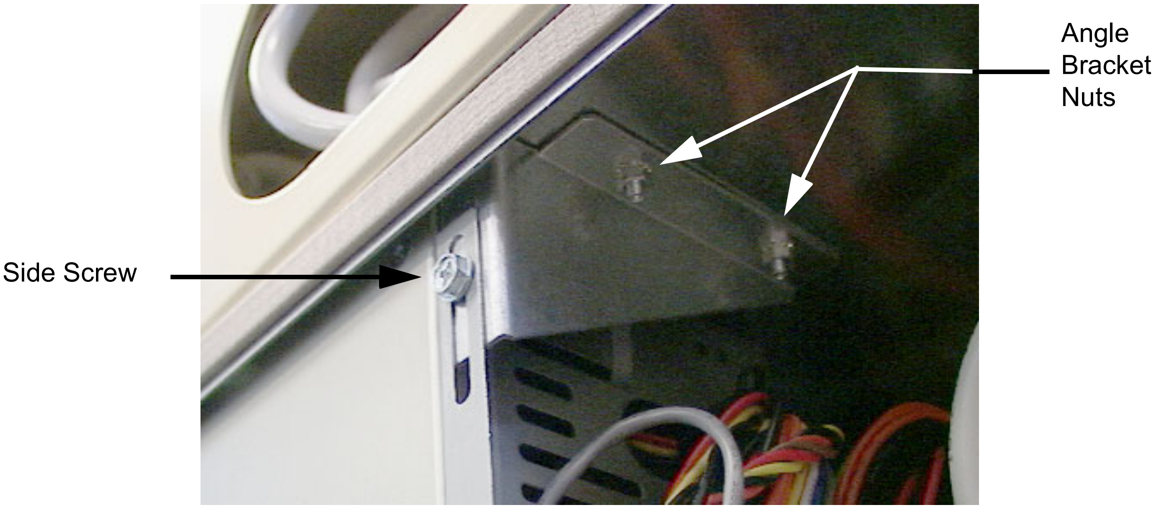


Figure 8-13 Remove Two Nuts

7.) Remove the screw holding the angle bracket to the side of the power supply, as shown in Figure 8-13 on page 8-21 .

8.) Remove the angle bracket and set it aside with the hardware.

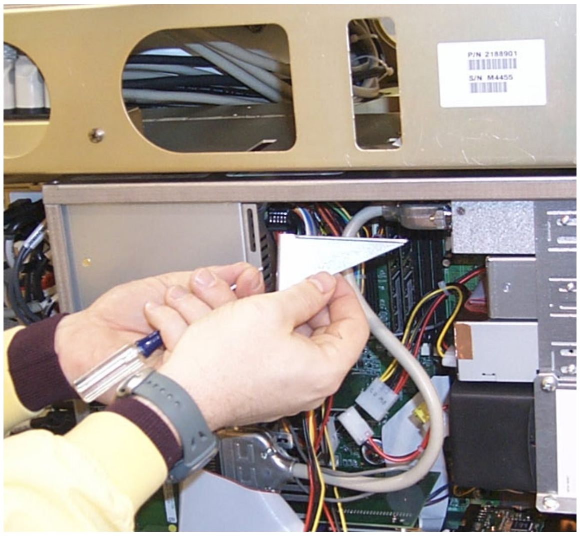


Figure 8-14 Remove Angle Bracket

9.) Refer to Figure 8-15 on page 8-22 . Remove the UPS Control cable (**C12**) from the back of the BEP.

10.) After the UPS Control cable is removed, loosen the screws of the UPS Control connector at the PCI slot panel. This should allow you to detach the connector from the back of the BEP and push it into the BEP case. This cable/connector assembly is part of the BEP Power Supply and must be removed with the supply.

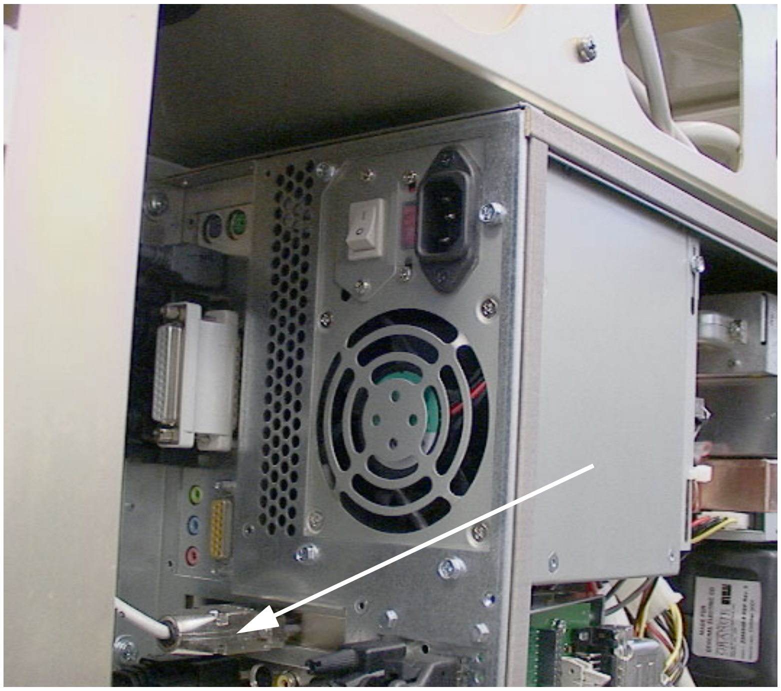


Figure 8-15 C12 UPS Connector

11.) Support the power supply while removing the 4 screws from the back of the power supply, as shown in Figure 8-16 on page 8-23

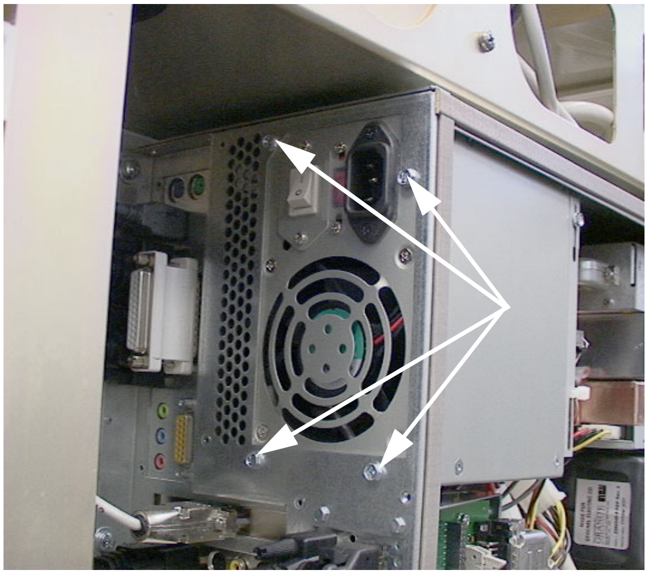


Figure 8-16 Four Power Supply Screws in the Back

12.) The power supply can now be removed and set on the floor while the last power cable is accessed.

13.) Disconnect the motherboard power cable, as shown in Figure 8-17 on page 8-23 , by pushing down on the back of the locking key in the center of the connector and pulling the connector out.

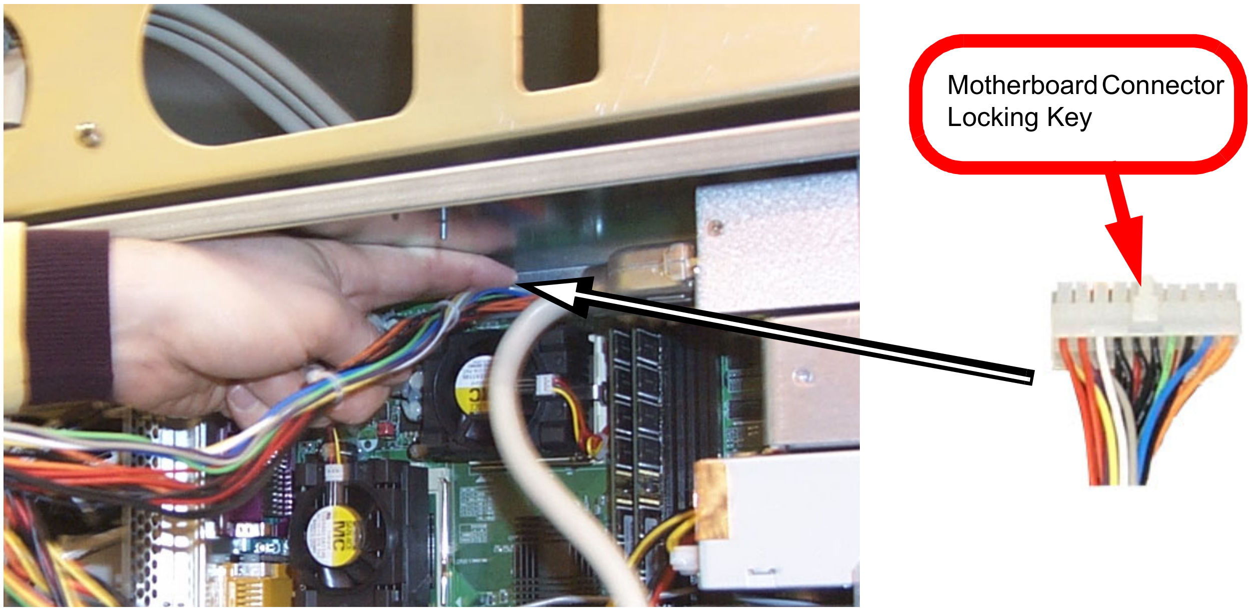


Figure 8-17 Disconnect Motherboard Power Cable

The power supply is now removed from the BEP. Set it aside for disposal.

8-4-5 Installing the New BEP Power Supply

Ensure that the On/Off switch on the back of the new power supply is set to the ON position.

Ensure that the Voltage Select Switch is set to 220 Volts.

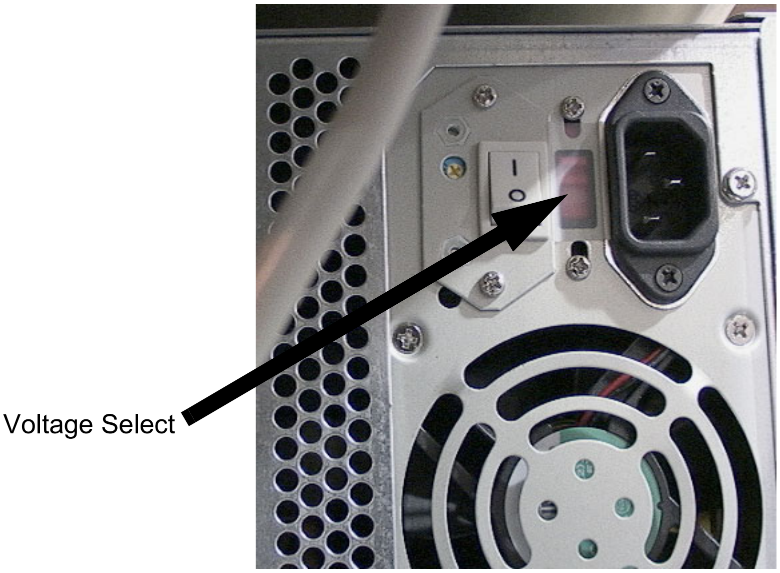


Figure 8-18 Power Supply Voltage Selector Location

Refer to Figure 8-19 on page 8-24 . If the power supply is going into a BEP1.0 ensure that the +5 Volt standby plug is installed in the new supply power cable. If the power supply is going to be installed in a BEP2.x ensure that this +5 Volt Standby plug is removed.

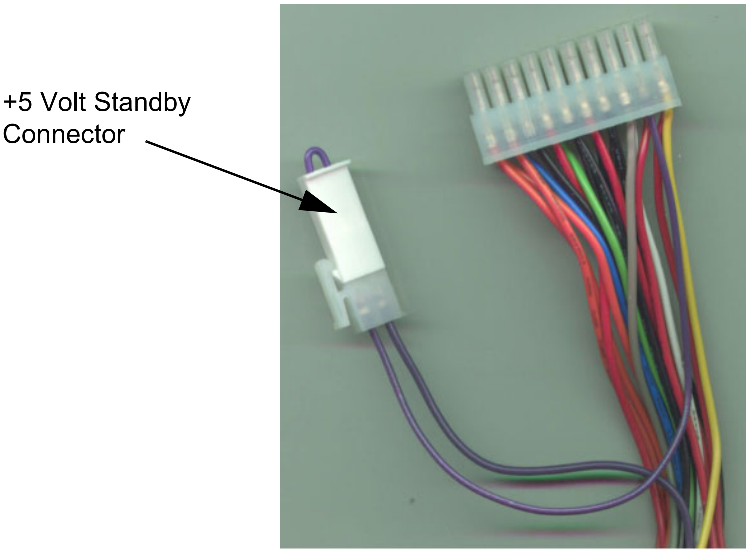


Figure 8-19 +5 Volt Standby Connector

8-4-5 Installing the New BEP Power Supply (cont'd)

Reverse the removal procedure to install the new BEP Power Supply.

1.) Install the UPS Control Connector Panel to the back of the BEP (Figure 8-15 on page 8-22).
2.) Attach the motherboard power connector from the power supply to the motherboard (Figure 8-17 on page 8-23). For BEP2.1, plug the purple +5Volt Standby connector into the cable coming from the DGVIVC Tray.
3.) Attach the Power Supply to the back of the case using the 4 screws removed in Step #11 on page 22, Figure 8-16 on page 8-23 .
4.) Replace the angle bracket securing the end of the power supply. Loosely fasten the side screw removed in Step #7 on page 21 then replaced and tighten the 2 nuts removed in Step #6 on page 21. Finally tighten the side screw.

NOTE: *It is normal to get a spark when this connection is made.*

5.) Attach the 5 power connectors, removed in Step #4 on page 20, to the:
    - CD
    - MO
    - PC2IO
    - HDD
    - PC Bird Card (If system has option)

NOTE: *All five power connectors are exactly alike. Reference the old power supply for cable routing purposes.*

6.) If necessary, neatly bundle the power cables together and ty-wrap them to the power supply as shown in Figure 8-11 on page 8-20 .
7.) Plug the power cable in the BEP power supply.
8.) Attach the UPS Battery to the Power Supply UPS Battery Connector removed in Step #5 on page 21.
9.) Replace the BEP side cover.
10.) Install all covers removed in the process. (click here to view the cover installation video).

Section 8-5
BEP HDD (Hard Disk Drive) Replacement Procedures

8-5-1 Manpower

One person, 1 hour + travel

8-5-2 Tools

Phillips screwdriver

5.5 mm wrench or nut driver

8-5-3 Preparations (click here to view the cover removal video)

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3.
2.) Remove the left side cover as shown in Section 8-2-2 on page 8-5.

8-5-4 BEP 1 HDD Replacement (2366650)

1.) Remove the BEP cover by turning the retaining screw counter-clockwise (Figure 8-20). Pull the back of the cover out and away from the BEP chassis.

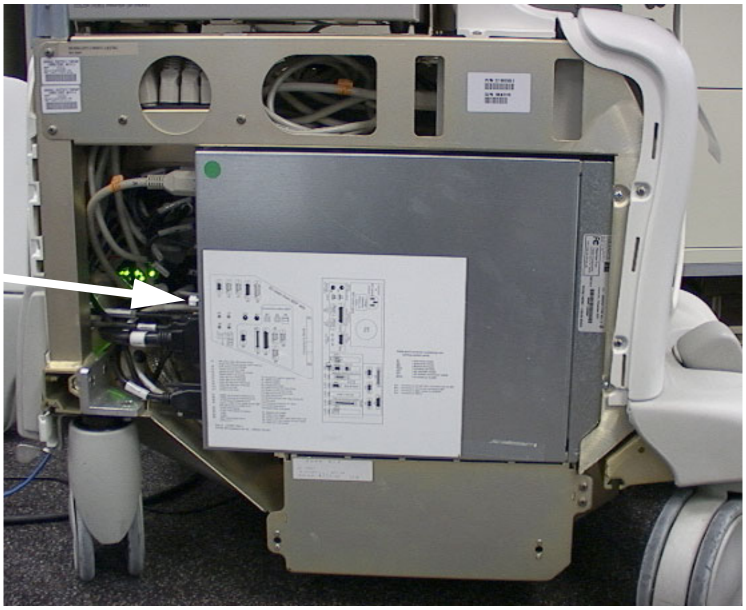


Figure 8-20 BEP Side Cover Removal

2.) On the bottom right side of the BEP is the HDD. Remove the single screw shown in Figure 8-21.

8-5-4 BEP 1 HDD Replacement (2366650) (cont'd)

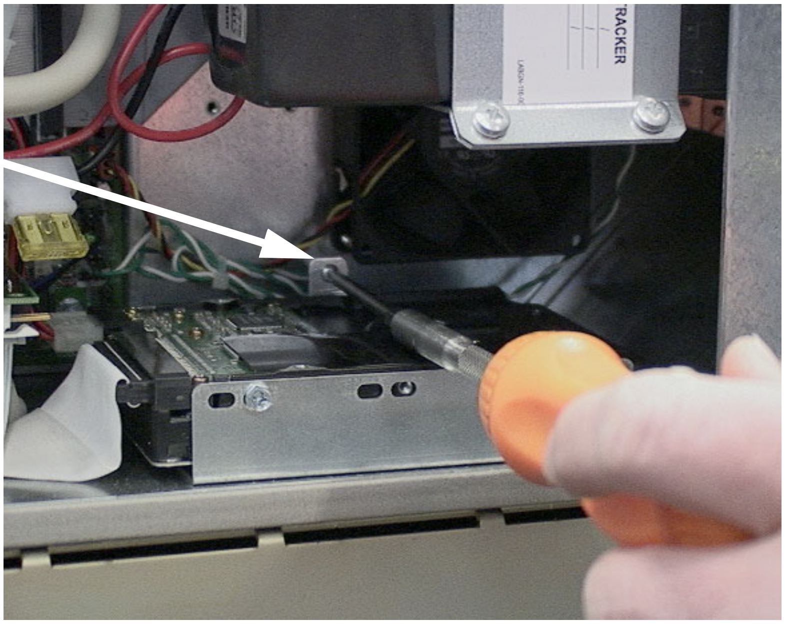


Figure 8-21 Loosen HDD Assembly

NOTE: *This is a little more difficult if the BEP has the 3D Option installed with the 3D card extending over the HDD.*

3.) Grab a hold of the HDD on each side and firmly pull towards you (Figure 8-22).

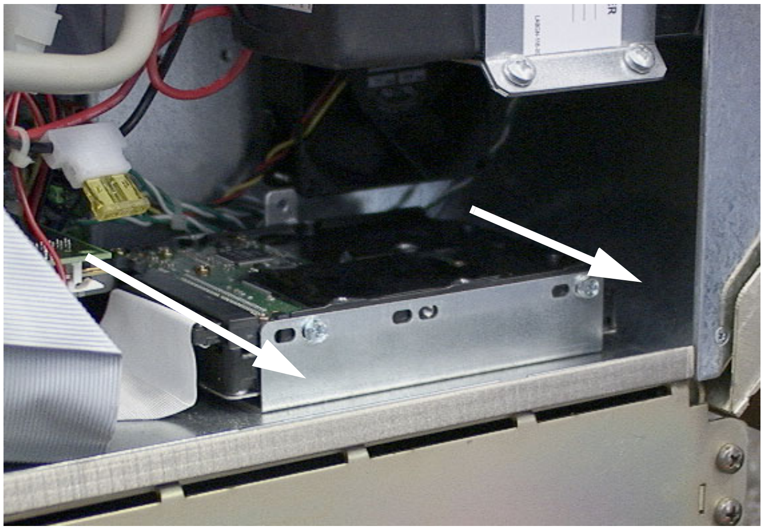


Figure 8-22 Pull HDD Assembly

4.) The HDD tray will be released from the tabs holding it to the BEP chassis (Figure 8-23).

8-5-4 BEP 1 HDD Replacement (2366650) (cont'd)

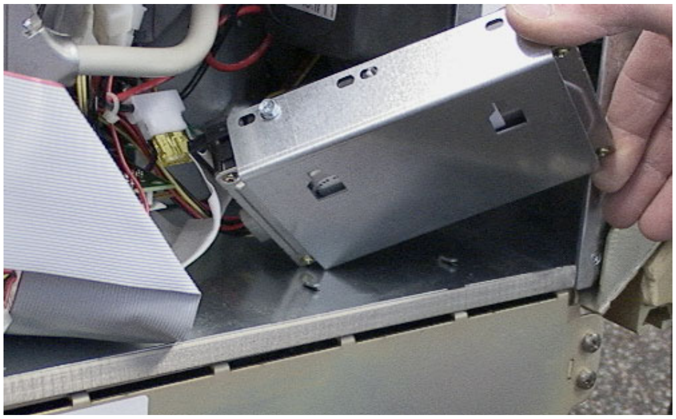


Figure 8-23 Lift Up HDD Assembly

5.) Disconnect the Power and IDE Cables from the back of the HDD.
6.) Remove the four screws that attach the HDD to the tray.

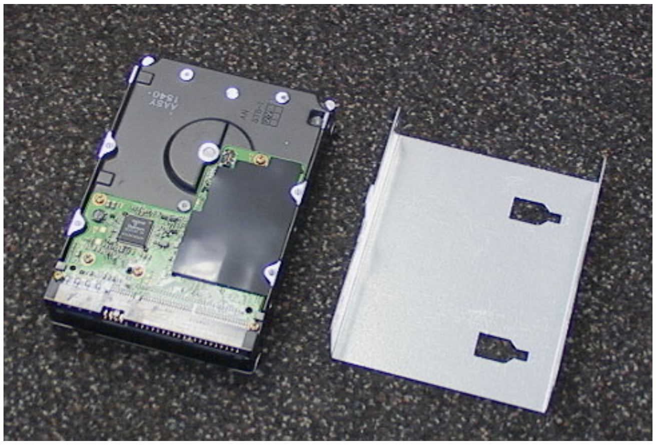


Figure 8-24 HDD and Tray

8-5-4 BEP 1 HDD Replacement (2366650) (cont'd)

7.) Check the jumper on the back of the new HDD to ensure it is the same as the old one (Figure 8-25).

The only jumper on the back of the Hard Disk Drive (HDD) should be set to Cable Select (CS). Refer to the diagram on the HDD to ensure that the CS jumper is in place. CS will allow Master/Slave determination by the cable.

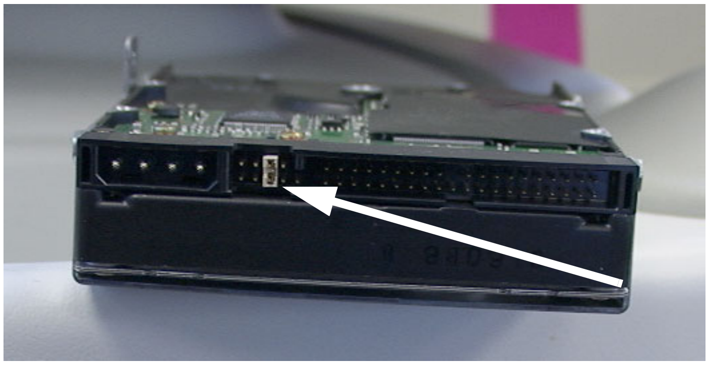


Figure 8-25 HDD EIDE Jumper

8.) Attach the new HDD to the tray with the four screws. See the orientation in Figure 8-24.

9.) Attach the power and IDE cables to the new HDD Assembly.

10.) Slide the assembly into the BEP chassis and ensure the chassis tabs engage the slots on the HDD tray(Figure 8-23).

11.) Secure the HDD assembly with the single screw in the center (Figure 8-21).

8-5-5 BEP 2.X HDD Replacement (2348186-31)

1.) Remove the BEP cover by turning the retaining screw counter-clockwise (Figure 8-26). Pull the back of the cover out and away from the BEP chassis.

2.) Unplug the Fan connected to the cover and set the cover aside.

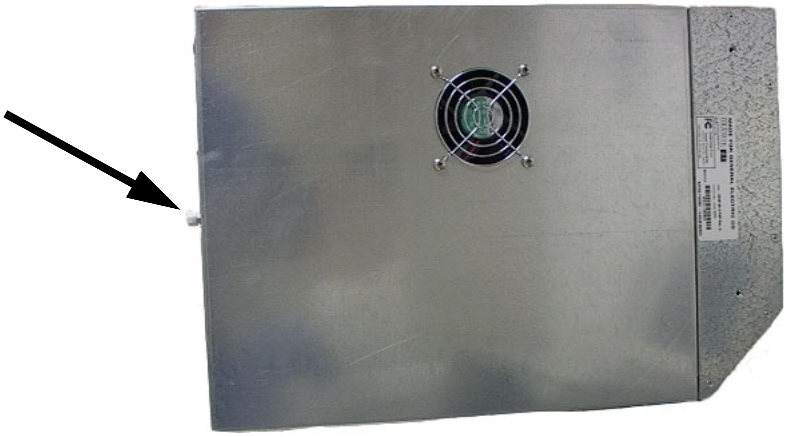


Figure 8-26 BEP 2.X Cover with Fan

3.) Locate the hard drive under the MOD or CD-RW drive tray and disconnect the power and IDE cables from the drive (Figure 8-27).

8-5-5 BEP 2.X HDD Replacement (2348186-31) (cont'd)

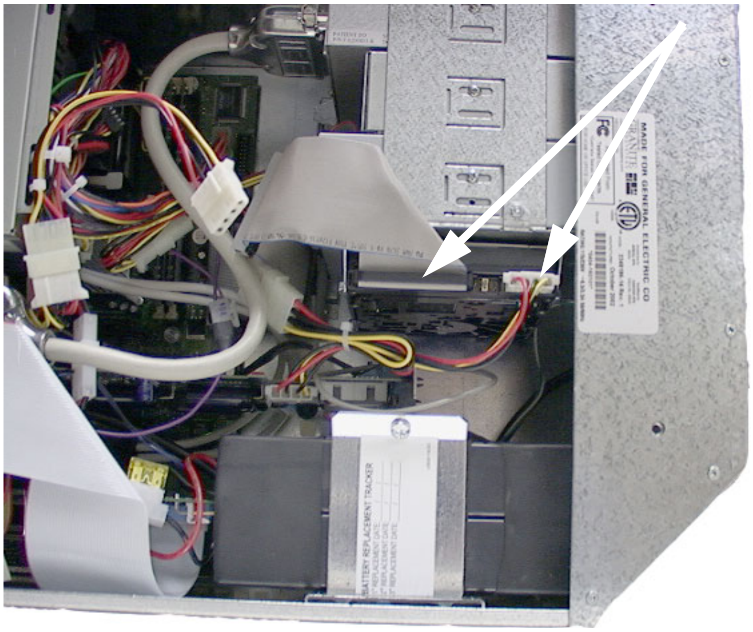


Figure 8-27 HDD Power and IDE Cables

4.) Remove the two 5.5 mm nuts that secure the HDD to the MOD/CD-RW tray (Figure 8-28).

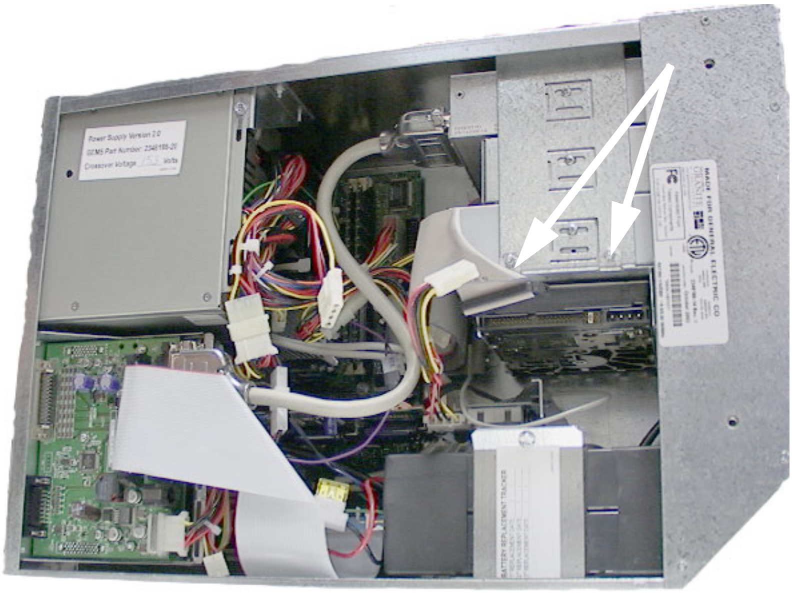


Figure 8-28 HDD Assembly Hardware

5.) Slide the HDD assembly out towards you and slightly down.

8-5-5 BEP 2.X HDD Replacement (2348186-31) (cont'd)

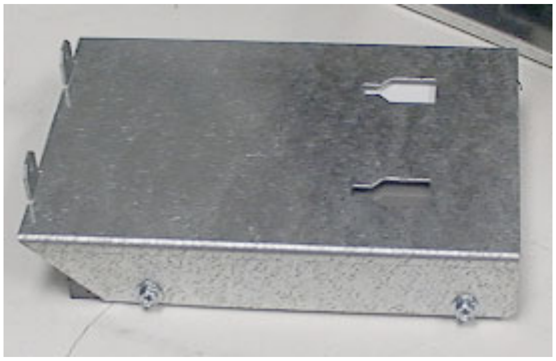


Figure 8-29 HDD Assembly with Tray

6.) The BEP 2.x HDD should come with the mounting hardware attached. If the replacement HDD does not come with a mounting plate, transfer the mounting plate to the ne HDD.

7.) Check the jumper on the back of the new HDD to ensure it is the same as the old one (Figure 8-25).

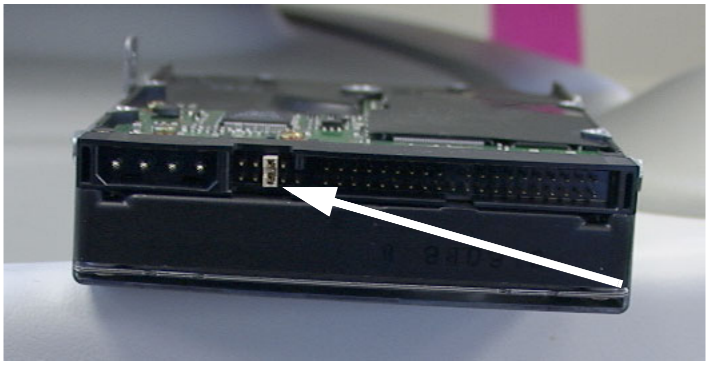


Figure 8-30 HDD EIDE Jumper

8.) Slide the new HDD assembly on to the mounting tabs on the bottom of the MOD/CD-RW tray (Figure 8-31).

8-5-5 BEP 2.X HDD Replacement (2348186-31) (cont'd)

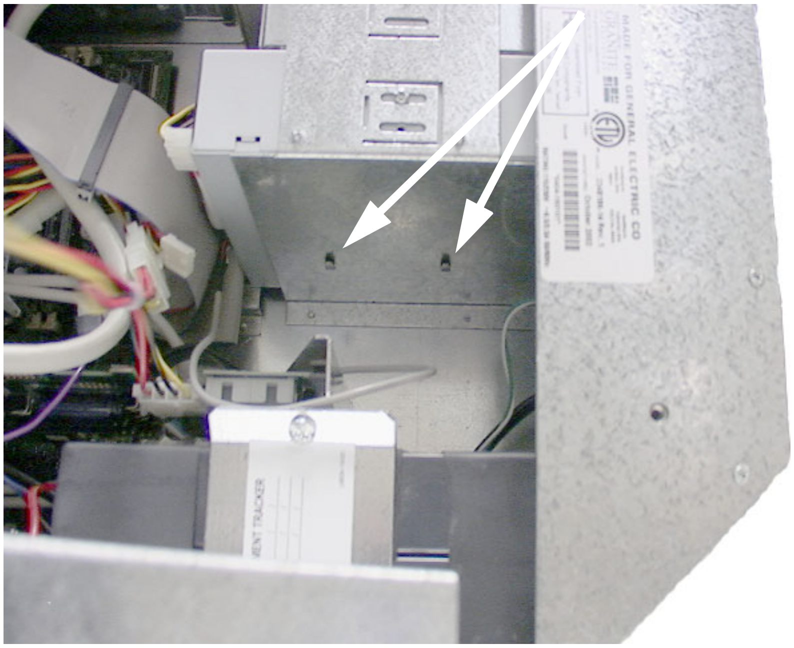


Figure 8-31 HDD Mounting Tabs

9.) Secure the assembly with the 5.5 mm nuts removed in step 3.

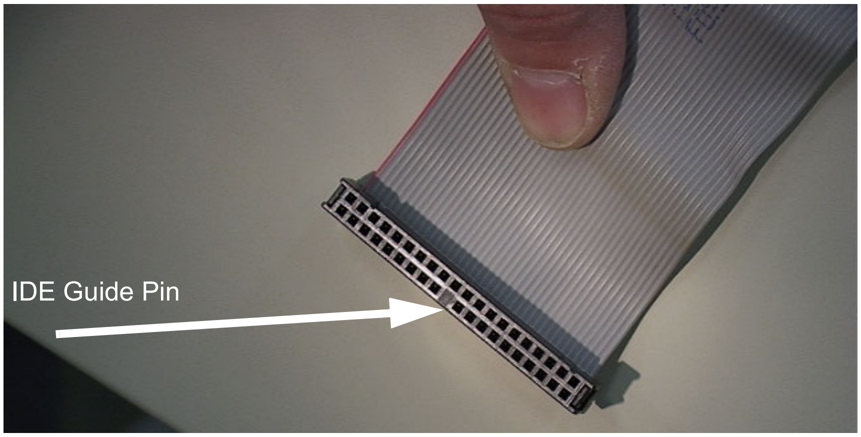


Figure 8-32 IDE Ribbon Connector

10.) Attach the Power and IDE to the back of the HDD. Pay attention to the orientation of the guide pin on the IDE Cable connector and the missing pin on the IDE connection of the HDD.

8-5-6 Loading Software

It may be a good idea to load software before replacing the covers.

Refer to loading Base Image software and loading Applications software.

1.) Plug in the power cable to the system, connect the system to the AC outlet and turn on the circuit breaker.
2.) Power up the system to begin the software load.

8-5-7 Replace Covers

1.) With the software load complete and verified, replace the BEP Cover.
2.) Replace the system right side cover.

Section 8-6
BEP CD-RW Drive Replacement Procedure (BEP 2.x and above only)

8-6-1 Manpower

One person, 1 hour + travel

8-6-2 Tools

Phillips screwdriver

8-6-3 Preparations (click here to view the cover removal video)

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3.
2.) Remove the left- and/or right-side covers as shown in Section 8-2-2 on page 8-5.
3.) Remove the front cover as shown in Section 8-2-5 on page 8-9.

8-6-4 CD-RW Drive Removal Procedure

NOTE: *Mounting hardware may vary in size from M3 to 4-40 threads. Hardware length may seem the same but in fact may be different and very critical. ALWAYS keep track of EXACTLY where each screw was removed so that it is returned to the same place on re-assembly.*

1.) Remove the side cover from the BEP. Carefully disconnect the cover fan power cable and set the cover aside.
2.) Disconnect the Power, IDE and Audio cables from the back of the CD-RW drive.

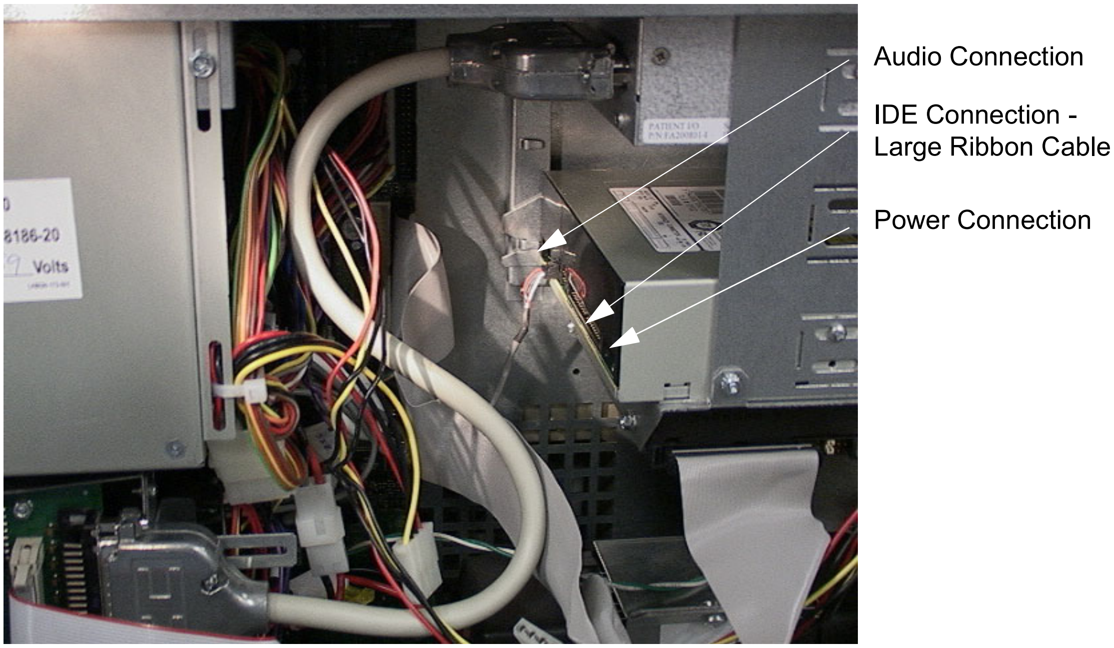


Figure 8-33 BEP CD-RW Connections

3.) Remove the one screw attaching the side of the CD-RW Drive as shown in Figure 8-34 on page 8-35 .

8-6-4 CD-RW Drive Removal Procedure (cont'd)

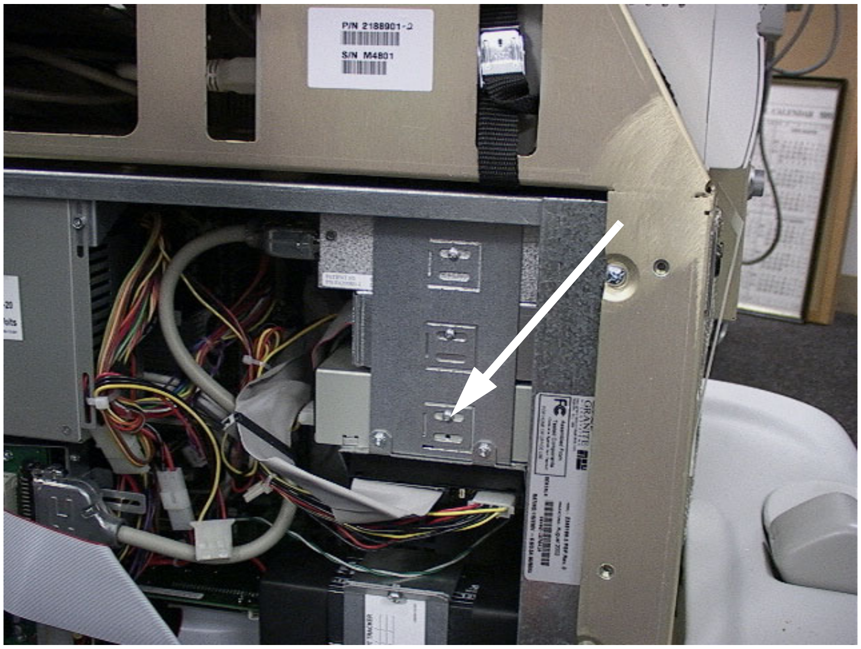


Figure 8-34 CD-RW Side Screw

4.) Peel back the adhesive trim as shown in Figure 8-35 on page 8-35 .

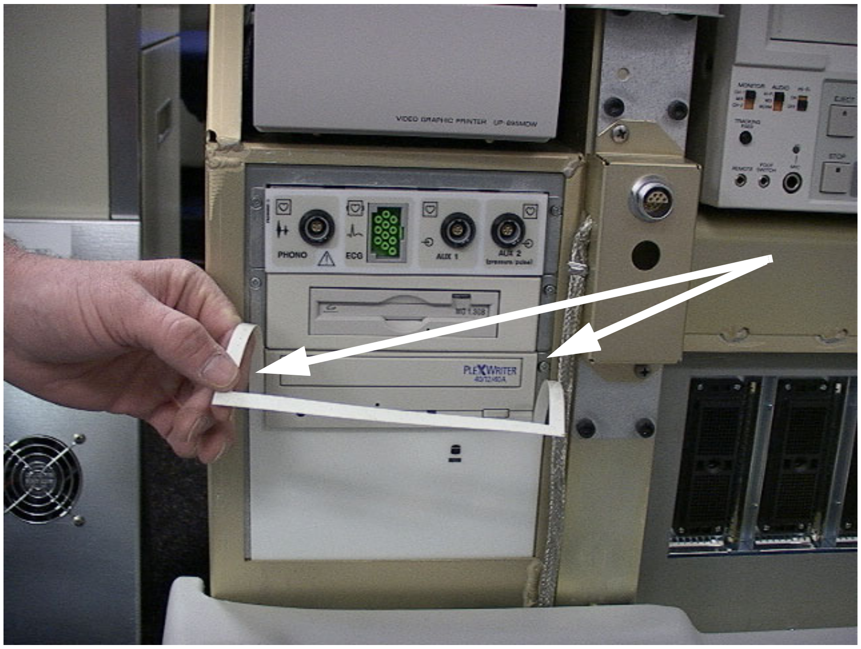


Figure 8-35 BEP Front Adhesive Trim

8-6-4 CD-RW Drive Removal Procedure (cont'd)

5.) Remove the two screws in the front of the CD-RW drive as shown in Figure 8-35 on page 8-35 .

6.) Slide the CD-RW drive out the front of the BEP as shown in Figure 8-36 on page 8-36 .

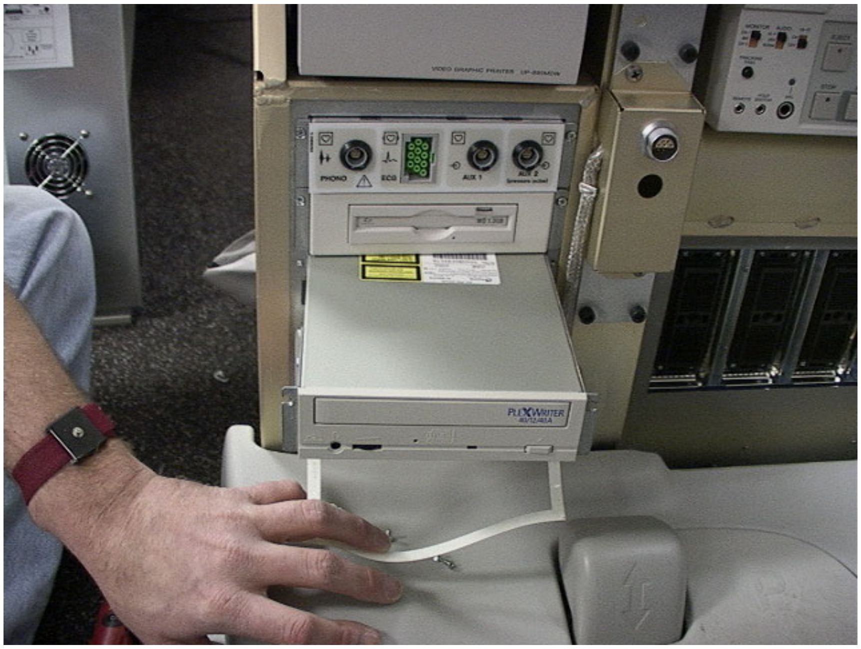


Figure 8-36 CD-RW Removal

8-6-5 CD-RW Drive Replacement Procedure

1.) Insert the new CD-RW Drive into the drive bay and secure it in the front with the two screws previously removed. refer to Figure 8-35 on page 8-35 .

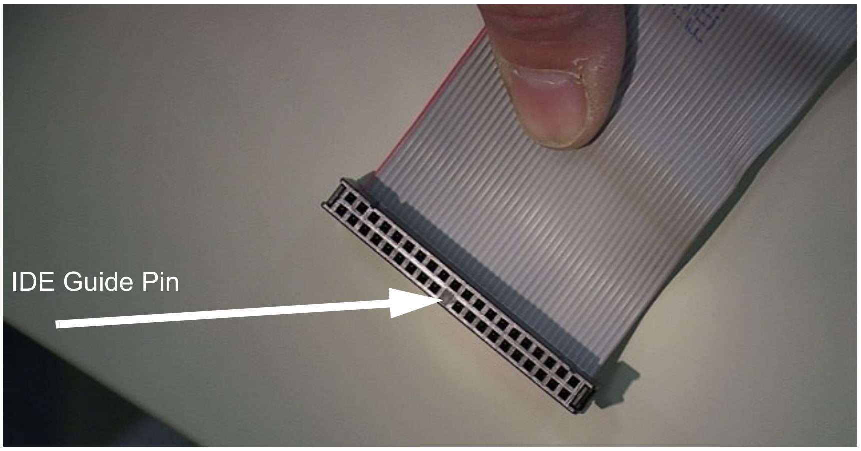


Figure 8-37 IDE Ribbon Connector

2.) Attach the one screw to the side of the CD-RW Drive through the rack. refer to Figure 8-34 on page 8-35 .

3.) Attach the Power, IDE and Audio cables to the back of the CD-RW drive. Pay attention to the orientation of the guide pin on the IDE Cable connector and the missing pin on the IDE connection of the CD-RW Drive.

4.) Ensure all cables are properly arranged and secure.

8-6-6 CD-RW Drive Replacement Procedure

5.) Connect the cover fan power cable and replace the side cover from the BEP.

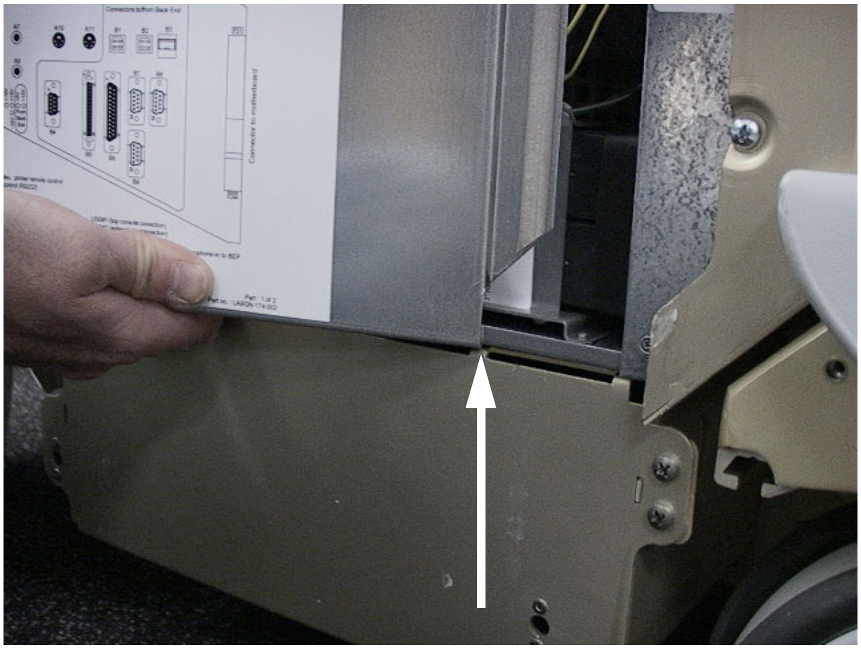


Figure 8-38 BEP Cover Installation Tip

NOTE: *When replacing the BEP Cover, ensure that you start it at the bottom to get the cover lip between the BEP chassis and AC transformer cover. Slide it forward and secure it.*

6.) Replace the front cover as shown in Section 8-2-5 on page 8-9.

7.) Replace the left- and/or right-side covers as shown in Section 8-2-2 on page 8-5.

8.) If required, Power On/Boot-up the system as described in Section 4-3-1 on page 4-2.

9.) Check CD-RW operation.

Section 8-7
BEP MOD Replacement Procedure (BEP 2.x and above only)

8-7-1 Manpower

One person, 1 hour + travel

8-7-2 Tools

Phillips screwdriver

8-7-3 Preparations (click here to view the cover removal video)

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3.

2.) Remove the left- and/or right-side covers as shown in Section 8-2-2 on page 8-5.

3.) Remove the front cover as shown in Section 8-2-5 on page 8-9.

8-7-4 MOD Drive Removal Procedure

NOTE: *Mounting hardware may vary in size from M3 to 4-40 threads. Hardware length may seem the same but in fact may be different and very critical. ALWAYS keep track of EXACTLY where each screw was removed so that it is returned to the same place on re-assembly.*

1.) Remove the side cover from the BEP. Carefully disconnect the cover fan power cable and set the cover aside.

2.) The MOD is enclosed in a metal case. The power connector will have to be unplugged at the power supply connectors. The IDE Cable will have to be unplugged from the CD-RW Drive and the Motherboard. See Figure 8-43 on page 8-41 for reference.

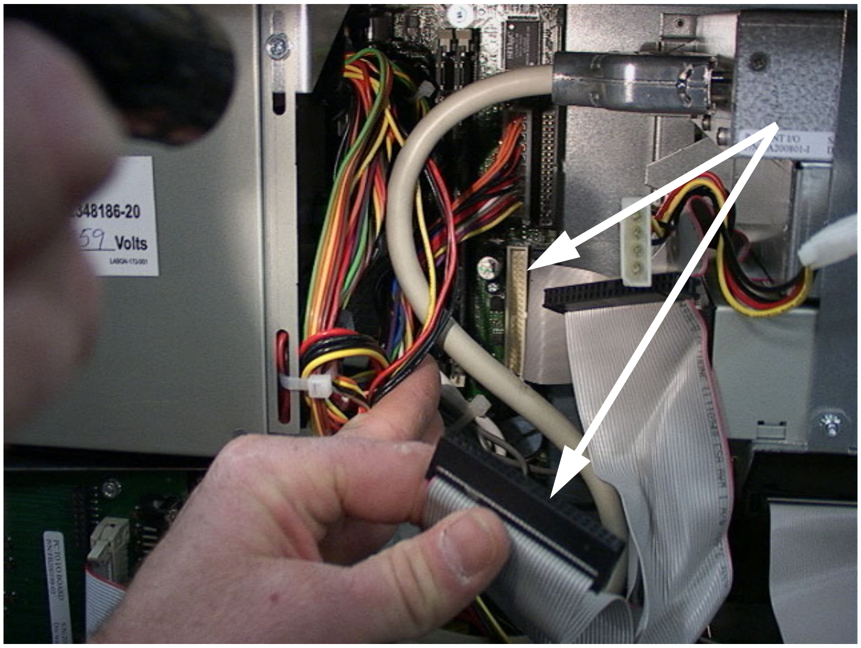


Figure 8-39 BEP Motherboard IDE Connection

3.) Remove the one screw attaching the side of the MOD as shown in Figure 8-40 on page 8-40 .

8-7-4 MOD Drive Removal Procedure (cont'd)

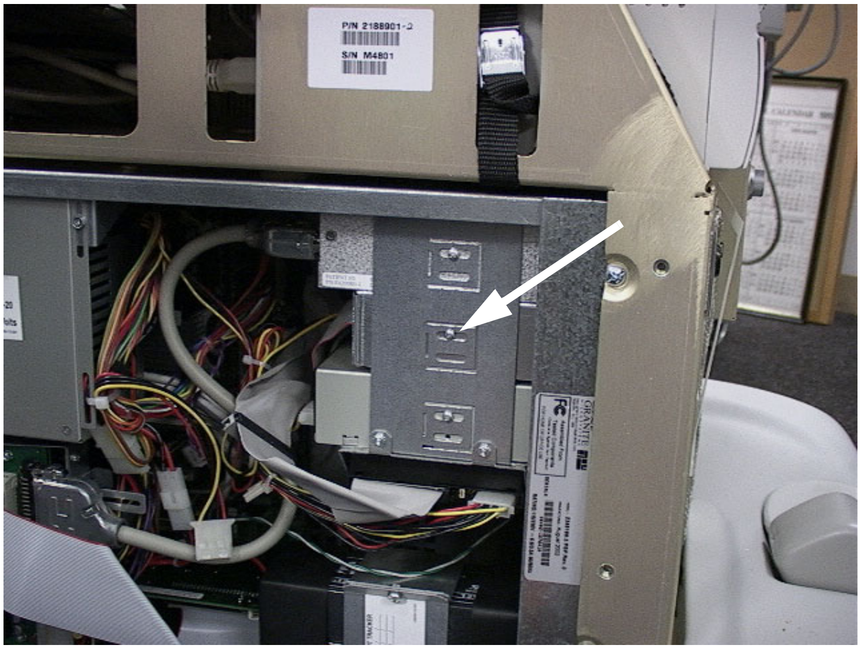


Figure 8-40 MOD Side Screw

4.) Peel back the adhesive trim as shown in Figure 8-41 on page 8-40 .

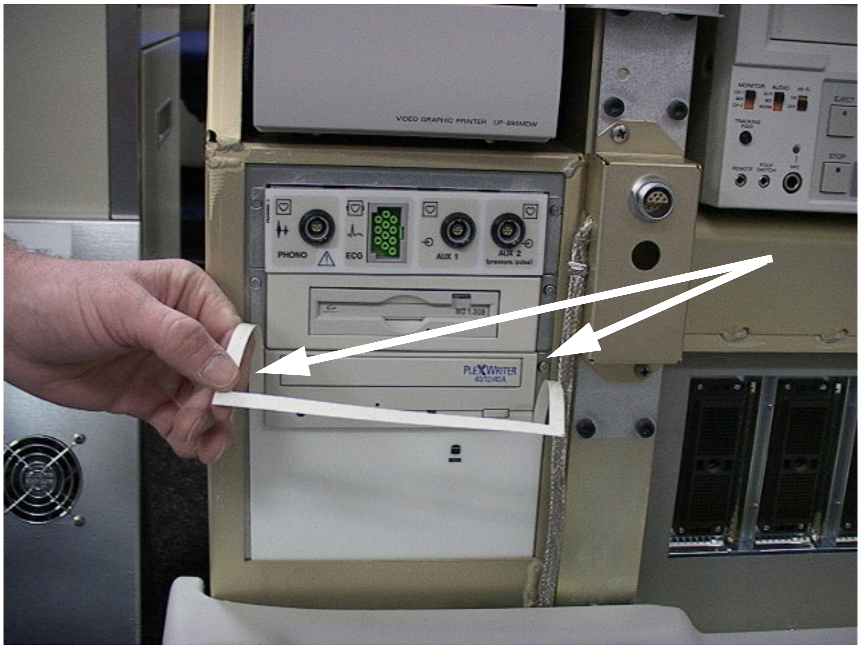


Figure 8-41 BEP Front Adhesive Trim

8-7-4 MOD Drive Removal Procedure (cont'd)

5.) Remove the two screws in the front of the MOD drive as shown in Figure 8-42 on page 8-41 .

6.) Slide the MOD out the front of the BEP as shown in Figure 8-42 on page 8-41 .

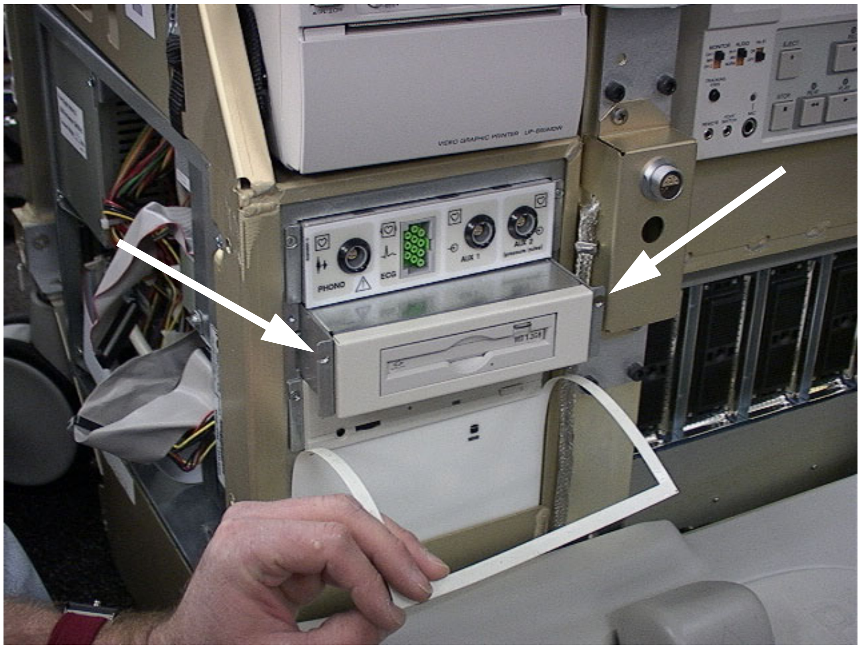


Figure 8-42 MOD Removal

7.) Remove the four screws, two on each side, to remove the top cover and side rails from the MOD case.

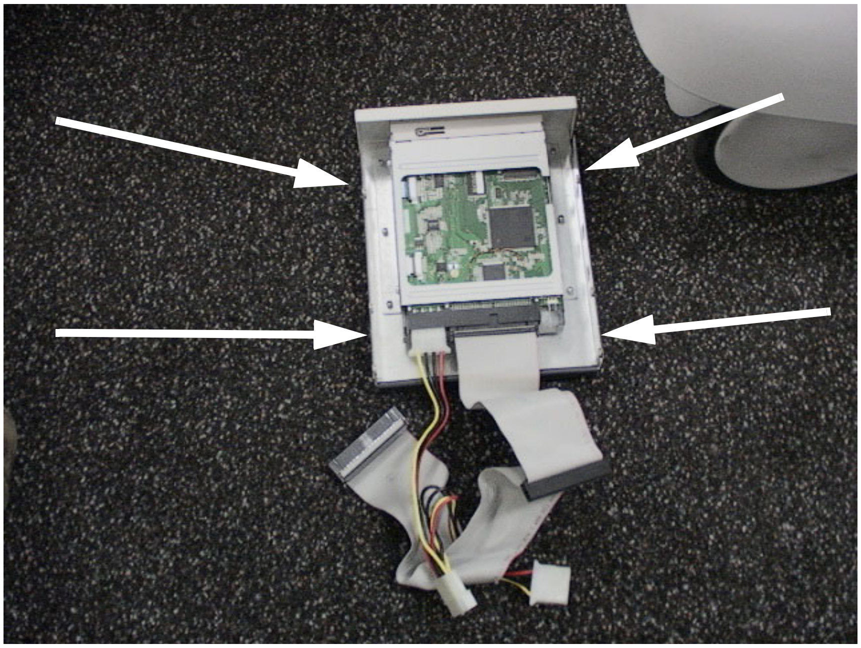


Figure 8-43 MOD with Case Cover Off

8-7-4 MOD Drive Removal Procedure (cont'd)

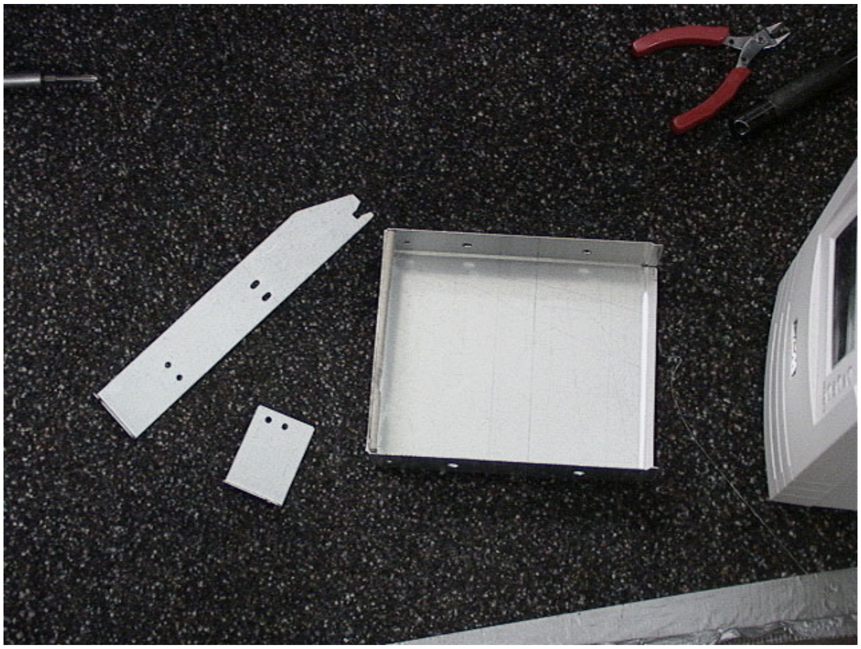


Figure 8-44 MOD Rails and Top Cover

8.) Remove the power and IDE Cables from the MOD. Refer to Figure 8-45 on page 8-42 .

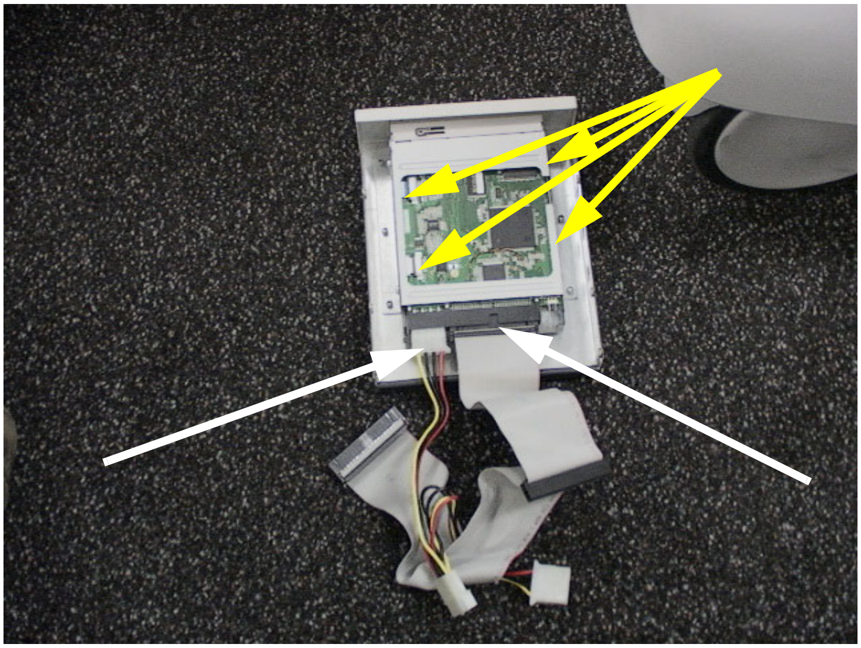


Figure 8-45 MOD Power and IDE Connections

9.) Refer to Figure 8-45 on page 8-42 and Figure 8-46 on page 8-43 , go through the side of the MOD case to remove the four screws holding the MOD to the case.

8-7-4 MOD Drive Removal Procedure (cont'd)

NOTE: Mounting hardware may vary in size from M3 to 4-40 threads. Hardware length may seem the same but in fact may be different and very critical. ALWAYS keep track of EXACTLY where each screw was removed so that it is returned to the same place on re-assembly.

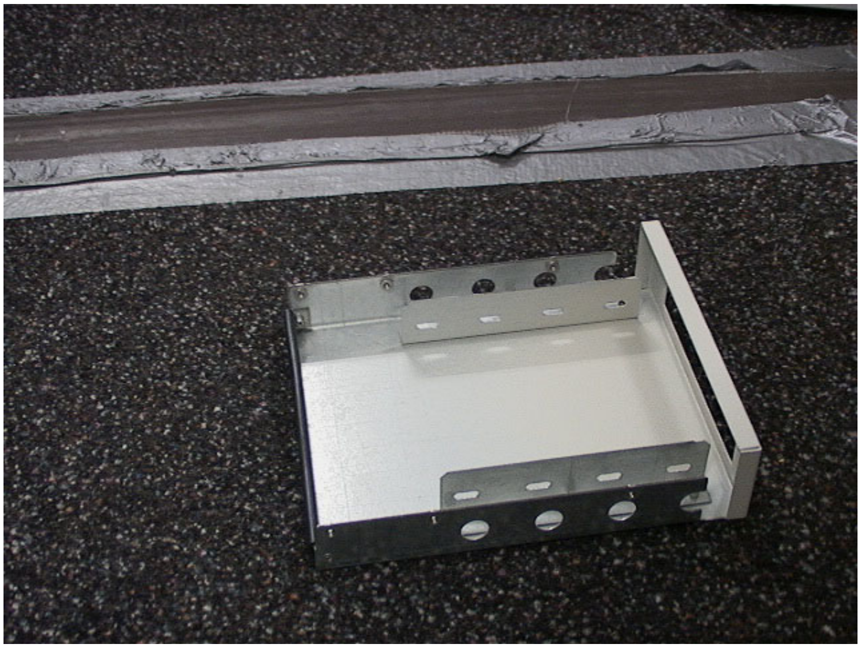


Figure 8-46 MOD Case without MOD

8-7-5 MOD Drive Installation Procedure

Now reverse the removal procedure to install the new MOD. It cannot be stressed enough to use the EXACT same screws to mount the new drive in the SAME position as they were removed.

If wrong screw, that is only slightly too long, is used to mount the MOD to the case the MOD will NOT function.

1.) Refer to Figure 8-45 on page 8-42 and Figure 8-46 on page 8-43 , go through the side of the MOD case to install the four screws mounting the MOD to the case.
2.) Attach the power and IDE Cables to the MOD. Refer to Figure 8-45 on page 8-42 .
3.) Install the four screws, two on each side, to attach the top cover and side rails from the MOD case.

NOTE: The side rails may need to be adjusted slightly so the MOD face is flush to the front of the BEP when it is installed in the chassis.

4.) Slide the MOD into the front of the BEP as shown in Figure 8-42 on page 8-41 .
5.) Install the two screws in the front of the MOD drive as shown in Figure 8-42 on page 8-41 .
6.) Place the adhesive trim back on the BEP front face as shown in Figure 8-41 on page 8-40 .
7.) Install the one screw securing the side of the MOD to the rack as shown in Figure 8-40 on page 8-40 .

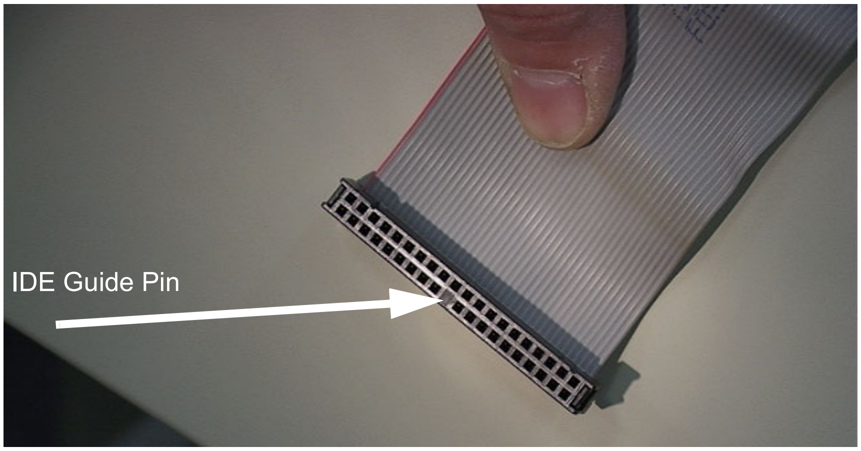


Figure 8-47 IDE Ribbon Connector

8.) Plug in the power connectors previously removed. Plug the IDE Cable into the CD-RW Drive and the Motherboard. See Figure 8-43 on page 8-41 for reference. Pay attention to the orientation of the guide pin on the IDE Cable connector and the missing pin on the IDE connection.

8-7-5 MOD Drive Installation Procedure (cont'd)

9.) Connect the cover fan power cable and replace the side cover from the BEP.

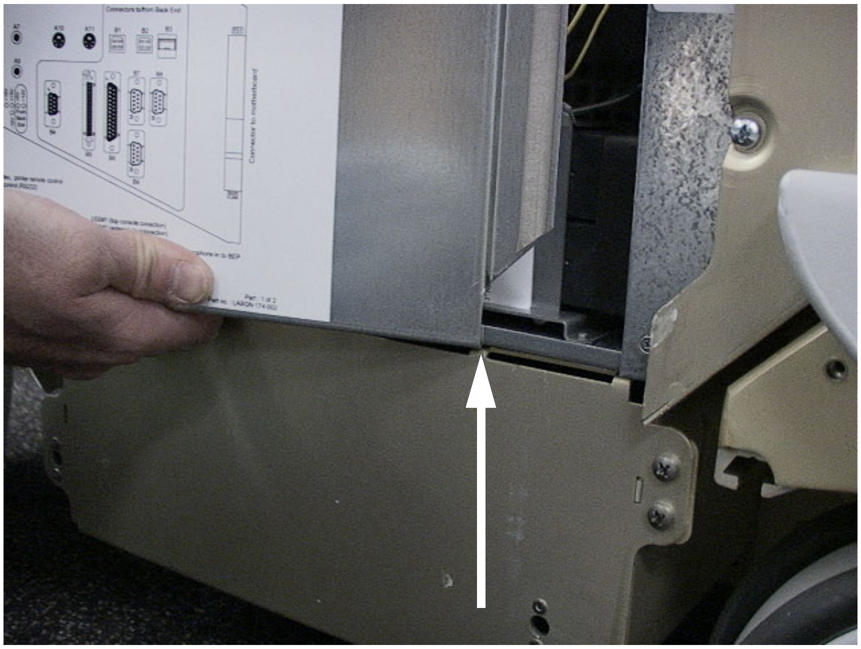


Figure 8-48 BEP Cover Installation Tip

NOTE: *When replacing the BEP Cover, ensure that you start it at the bottom to get the cover lip between the BEP chassis and AC transformer cover. Slide it forward and secure it.*

10.) Replace the console front cover as shown in Section 8-2-5 on page 8-9.

11.) Replace the left- and/or right-side covers as shown in Section 8-2-2 on page 8-5.

12.) If required, Power On/Boot-up the system as described in Section 4-3-1 on page 4-2.

13.) Check MOD operation.

Section 8-8
BEP Patient I/O Replacement Procedure (BEP 2.x and above only)

8-8-1 Manpower

One person, 1 hour + travel

8-8-2 Tools

Phillips screwdriver

8-8-3 Preparations (click here to view the cover removal video)

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3.
2.) Remove the left- and/or right-side covers as shown in Section 8-2-2 on page 8-5.
3.) Remove the front cover as shown in Section 8-2-5 on page 8-9.

8-8-4 Patient I/O Removal Procedure

NOTE: *Mounting hardware may vary in size from M3 to 4-40 threads. Hardware length may seem the same but in fact may be different and very critical. ALWAYS keep track of EXACTLY where each screw was removed so that it is returned to the same place on re-assembly.*

1.) Remove the side cover from the BEP. Carefully disconnect the cover fan power cable and set the cover aside.
2.) Disconnect the cable from the back of the patient I/O. It may be easier to disconnect this cable at the I/O VIC Tray because access is limited due to space behind the Patient I/O.

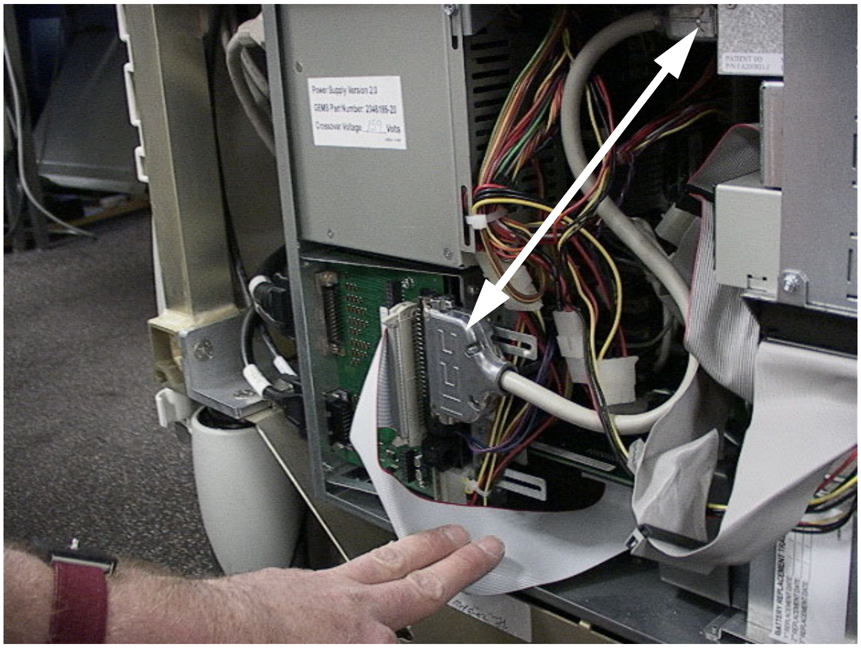


Figure 8-49 Patient I/O Connection

3.) Remove the one screw attaching the side of the Patient I/O as shown in Figure 8-50 on page 8-47 .

8-8-4 Patient I/O Removal Procedure (cont'd)

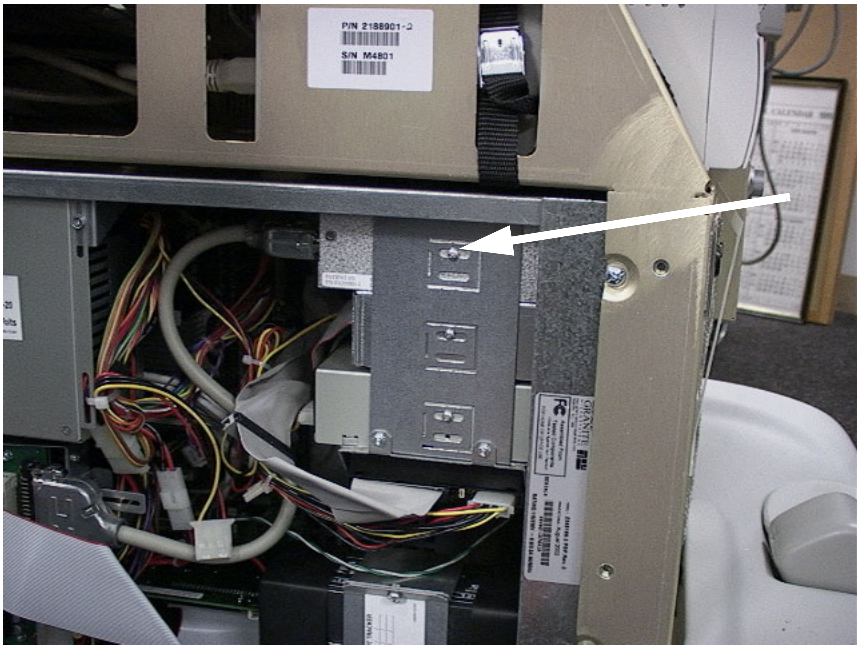


Figure 8-50 CD-RW Side Screw

4.) Peel back the adhesive trim as shown in Figure 8-51 on page 8-47 .

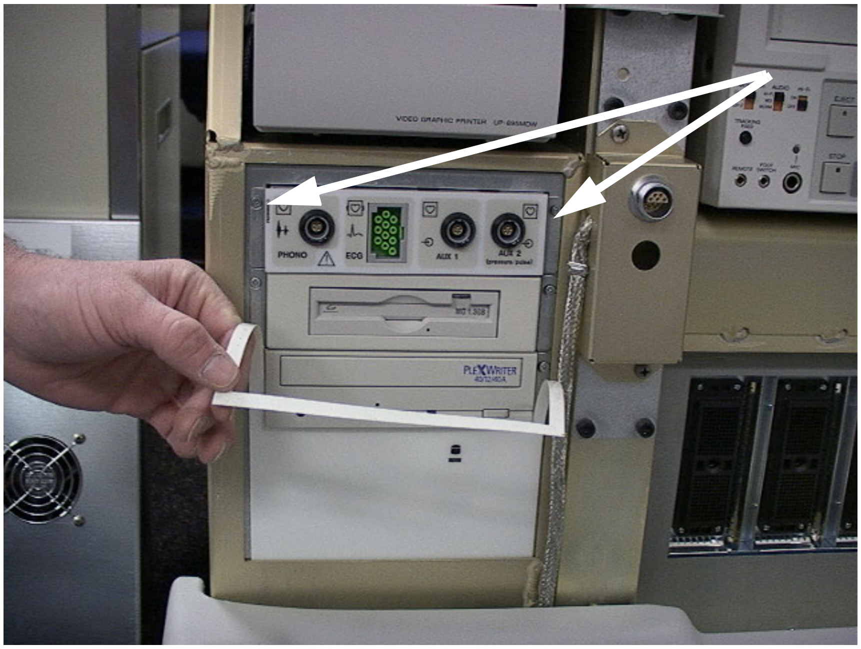


Figure 8-51 BEP Front Adhesive Trim

8-8-4 Patient I/O Removal Procedure (cont'd)

5.) Remove the two screws in the front of the Patient I/O as shown in Figure 8-51 on page 8-47 .
6.) Slide the Patient I/O out the front of the BEP.
7.) Remove the interface cable from the back of the Patient I/O.

8-8-5 Patient I/O Replacement Procedure

1.) Attach the interface cable to the back of the new Patient I/O.
2.) Insert the new Patient I/O and cable into the drive bay and secure it in the front with the two screws previously removed. refer to Figure 8-51 on page 8-47 .

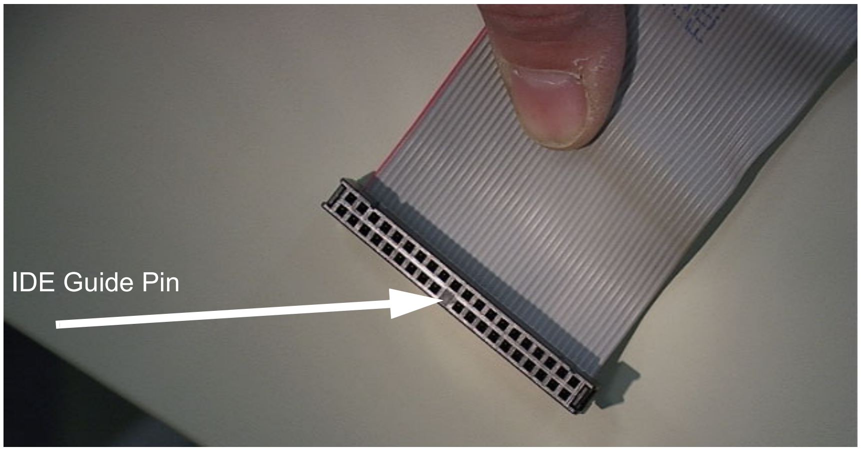


Figure 8-52 IDE Ribbon Connector

3.) Attach the one screw to the side of the Patient I/O through the rack. refer to Figure 8-50 on page 8-47 .
4.) Attach the Patient I/O interface cable to the BEP IO VIC Tray. Ensure all cables are properly arranged and secure.

8-8-5 Patient I/O Replacement Procedure (cont'd)

5.) Connect the cover fan power cable and replace the side cover from the BEP.

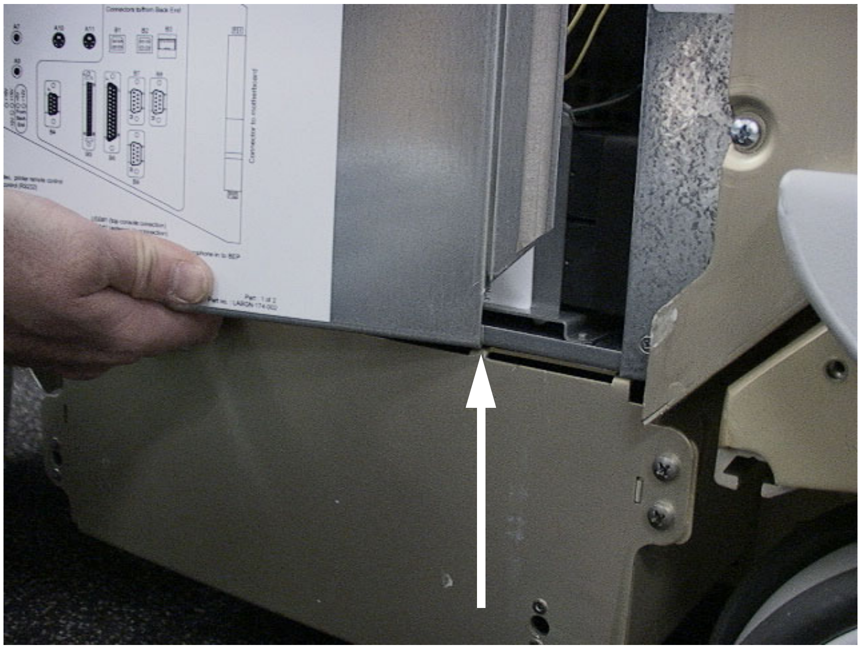


Figure 8-53 BEP Cover Installation Tip

NOTE: When replacing the BEP Cover, ensure that you start it at the bottom to get the cover lip between the BEP chassis and AC transformer cover. Slide it forward and secure it.

6.) Replace the front cover as shown in Section 8-2-5 on page 8-9.

7.) Replace the left- and/or right-side covers as shown in Section 8-2-2 on page 8-5.

8.) If required, Power On/Boot-up the system as described in Section 4-3-1 on page 4-2.

9.) Check Patient I/O operation.

Section 8-9
Power Supply Battery Pack Replacement Procedure

8-9-1 Manpower

One person, .5 hour + travel

8-9-2 Tools

Phillips screwdriver

8-9-3 Preparations (click here to view the cover removal video)

We anticipate,with the exception of a failure, batteries will only need to be replaced once every three years.

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3.
2.) Remove the left- and/or right-side covers as shown in Section 8-2-2 on page 8-5.
3.) Remove the upper rear cover as shown in Section 8-2-3 on page 8-7.
4.) Remove the lower rear cover as shown in Section 8-2-6 on page 8-10.
5.) Remove the Back End Processor as shown in Section 8-3-4 on page 8-14.

8-9-4 Power Supply Battery Pack Removal Procedure

1.) Remove the cover of the Back End Processor.
2.) Remove the four screws from the power supply battery pack cover plate.
3.) Disconnect the battery pack connection wire.
4.) Remove the power supply battery pack from the Back End Processor.

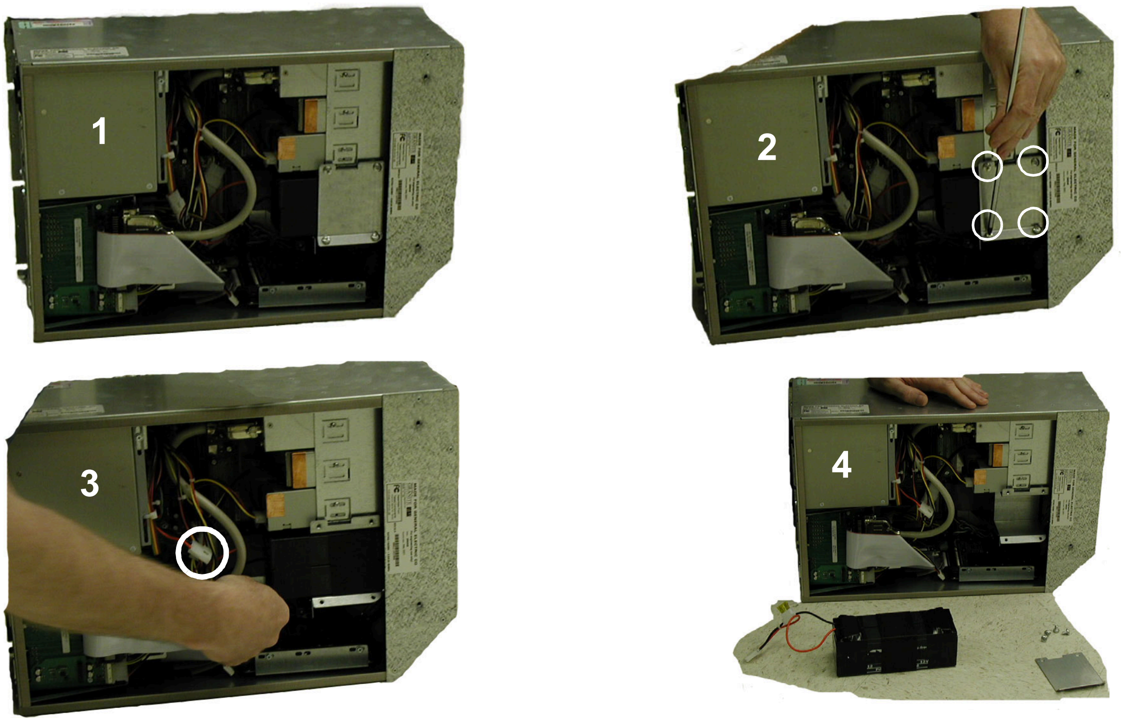


Figure 8-54 Removing / Installing the Power Supply Battery Pack

8-9-5 Power Supply Battery Pack Installation Procedure

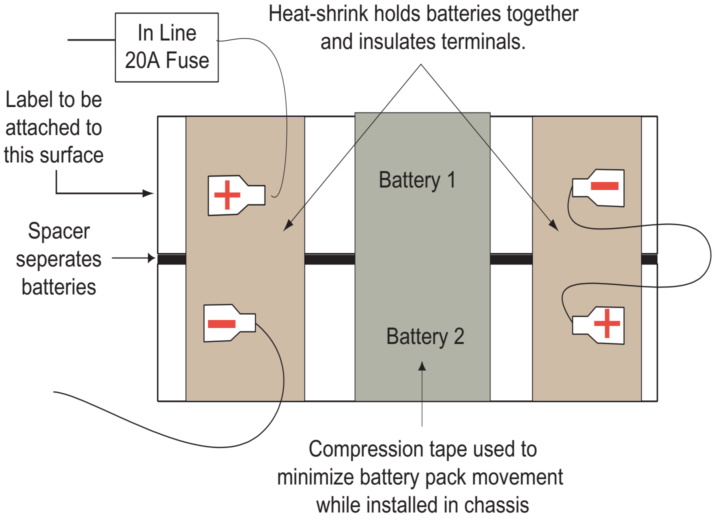


Figure 8-55 Power Supply Battery Pack

1.) Slide the new power supply battery pack into its position in the Back End Processor.
2.) Attach the power supply battery pack cover plate and secure it with the four screws removed in Section 8-9-4 on page 8-50.
3.) Apply Power .... turn the system on.
4.) Connect the new battery pack to the power supply connector while power is applied to the Back End Processor. This will avoid a possible spark while connecting the battery.

CAUTION **The battery pack contains a 24V charge that will cause a spark when it is re-connected to the power supply without power applied to the Back End Processor. Be careful that this spark does not damage any equipment or cause any personal injury.**

To avoid the spark, connect the battery with power applied to the BackEnd Processor.

5.) Attach the cover for the Back End Processor removed in Section 8-9-4 on page 8-50.
6.) Install the Back End Processor into the scanner as described in Section 8-3-6 on page 8-16.

The UPS batteries will drain slightly when the system is in the off condition. The off condition is defined as:

- Circuit Breaker in the OFF position
- System unplugged from the wall outlet

If the system is left in the OFF condition for an extended period of time (3 to 5 days or more), the system may not boot up or may beep when turned ON. Should this occur, the system needs to recharge the UPS batteries. This could take 15 minutes to as long as 24 hours, depending on the battery age, system input voltage and system temperature.

To eliminate draining the UPS batteries, the system should remain plugged into the wall outlet with the circuit breaker in the ON position.

Section 8-10
Before Starting a Software Upgrade

8-10-1 Printers

In R2.1.0 software and greater, if the customer has an HP990, HP970, UP-D50, UP-D895, UP-D21 or Talley printers, any settings they have made in the device driver, such as Gray Scale Images, will be lost. These printer settings will need to be recorded. You need to go to Utilities>Periperals>Printers in order to record the printer settings.

8-10-2 Save Connectivity Settings

NOTE: ***DICOM TCPIP settings should not be deleted with the Base Image Load due to the use of upgrade scripts. However, It may be helpful to record this settings before proceeding in case an error occurs in the loading of software.***

NOTE: DICOM Workflows and DICOM Device Configurations are on the "D:" drive and will be saved when User Defined Cohfigurations are saved.

If you want to Import exams back on to your system after the FMI, you should record any vital DICOM data before proceeding with this FMI or upgrading software.

1.) Select Utilities>Connectivity>TCPIP tab and record all information on that tab with particular attention to:
   - The "Enable DHCP" box should **NOT** be checked
   - Computer Name: ______________________________
   - IP-Address: ______/________/_________/_________
   - Subnet Mask: ______/________/________/________
   - Remote Archive IP-Address: ______/________/_________/_________
   - Remote Archive Name: ______________________________________

If the system has been Insite enabled, open the Service Diagnostic Interface and record InSite IP Address settings.

2.) Select the "Wrench" Icon. Log in as GE Service using the current password.
3.) Select *Utilities>iLinq Configuration Utility>Accept (3 times)>InSite Checkout* tab
4.) Record the Insite IP Address: _________/__________/__________/_________ and
Unlabeled IP Address: __________/___________/__________/_________
   - In the unlabeled IP Address line enter the System IP Address. This may be either the one obtained from the hospital administrator or if the system is not on a network it would be the factory default address. This address can also be found in the *System>Connectivity>TCP/IP* Tab
5.) Select *the Device Connection* Tab and record:
CPU Serial Port Name ____________________ CPU Serial Port Speed ____________________
6.) Select *Exit* in the Device Connection screen.
7.) Select *OK* in the Exit Confirmation window.
8.) Close the Netscape Diagnostic window.

Section 8-11
Image Management Guide

8-11-1 Managing Patient Data and Presets

Save to MOD or CD-R any patient data, images, and system presets that have been stored or configured. Installing the base operating software may delete some patient data, images and system setups saved on the system.

8-11-1-1 Patient Images and Data

Save As to View on any PC

Use this to save images (Dicom or Raw Dicom) in a computer-friendly format (.avi or .jpeg) so you can view it on any PC.

Move Images to Archive

Use this to take images off your Ultrasound system onto removable media for long-term archive. This is the way to free up hard disk space, rather than deleting images.

Export/Import Data/Images Between Systems

Use this to copy both patient data and images for specified patient(s) from one system to another.

8-11-1-2 Preset Data

Patient, Report, and User-Defined Backup Protocols

Back up patient data AFTER you've archived (moved) images so that the pointers to the patient's images reflect that the images have been moved to removable media and are no longer on the hard drive.

8-11-1-3 Backup Media

CD-ROM Media Requirements

Only use CD-R CD-ROMs, DO NOT use CD-RW CD-ROMs. Also, the CD-R CD-ROM MUST support 16x writing speed or greater.

CD-ROM Handling Tips

To eject the CD-ROM, always press ***F3***. **DO NOT** press the eject button on the CD Drive.

Always finalize the CD-ROM. This allows you to read the CD-ROM on any other PC.

DO NOT finalize the CD if you want to add more images to the CD.

8-11-2 Export/Import (Moving Data Between Ultrasound Systems)

To move exams from one Ultrasound system to another, you need to export/import exam information.

NOTE: Both database information and images are exported. No data is deleted from the local archive when exporting data.

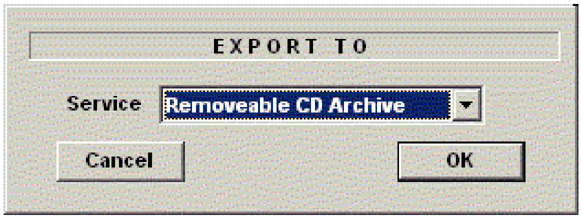
8-11-2-1 Exporting Data

To export an exam(s) to a compatible Ultrasound system,

1.) Format the removable media (MOD or CD-ROM). Label the removable media. Answer Yes/ OK to the messages.

2.) Press Patient. Deselect any selected patient(s) in the search portion of the Patient screen. Press More (located at the lower, right-hand corner of the Patient menu).

3.) Select Export. Specify the type of removable media (MOD or CD-ROM) on the Export pop-up. Press OK. Then, please wait until the Patient menu is visible.


EXPORT TO

Service: Removeable CD Archive

Figure 8-56   Export Pop-up Message

4.) In the patient list at the bottom of the Patient menu, select the patient(s) you want to export. You can use Windows commands to select more than one patient.
To select a consecutive list of patients, click the cursor on the first name, move the cursor to the last name, then press and hold down the Shift+right Set key to select all the names.
To select a non-consecutive list of patients, click the cursor at the first name, move the cursor to the next name, then press and hold down the Ctrl+right Set key, move the cursor to the next name, then press and hold down the Ctrl+right Set key again, etc.
You can also search for patients via the Search key and string.
Or, Select All from the Select All/Copy Patient Menu:

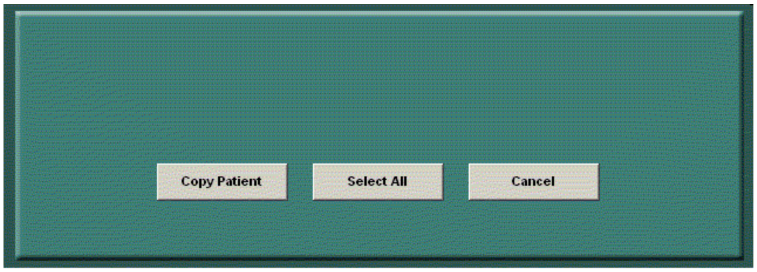


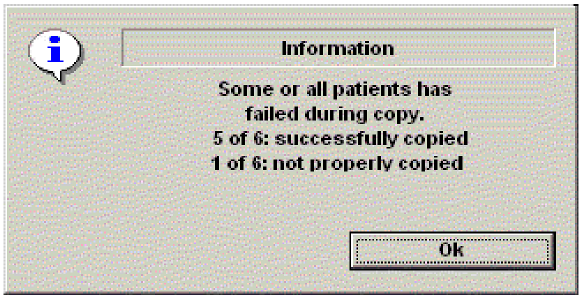
Figure 8-57   Select All/Copy Patient Menu

NOTE: You need to use your best judgment when moving patients' images. If there are lots of images or loops, then only move a few patients at a time.

8-11-2 Export/Import (Moving Data Between Ultrasound Systems) (cont'd)

5.) Once you have selected all of the patients to export, press Copy Patient from the Select All/ Copy Patient Menu.

6.) Informational status messages appear as the copy is taking place. A final status report pop-up message appears. Press OK.



Some or all patients has
failed during copy.
5 of 6: successfully copied
1 of 6: not properly copied

Figure 8-58 Export Completion Status Message

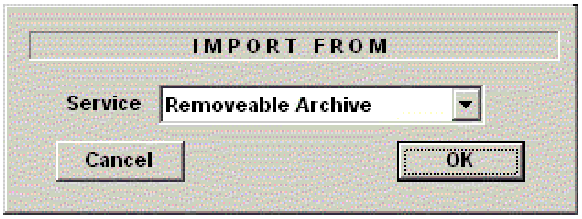
1.) Press ***F3*** to eject the media. Specify that you want to finalize the CD-ROM. However, if you want to import this data to another system, do not finalize the CD.

8-11-2-2 Importing Data

To import an exam(s) to another Ultrasound system,

1.) At the other Ultrasound system, insert the MOD or CD-ROM.

2.) Press Patient, press More, then Import. The Import from pop-up message appears. Press OK.



Service: Removeable Archive

Figure 8-59 Import Pop-up Message

3.) The Patient menu just shows the patients available for import from the removable media you just loaded onto the system.

4.) Select the patients to be imported.

5.) Press Copy Patient from the Select All/Copy Patient menu.

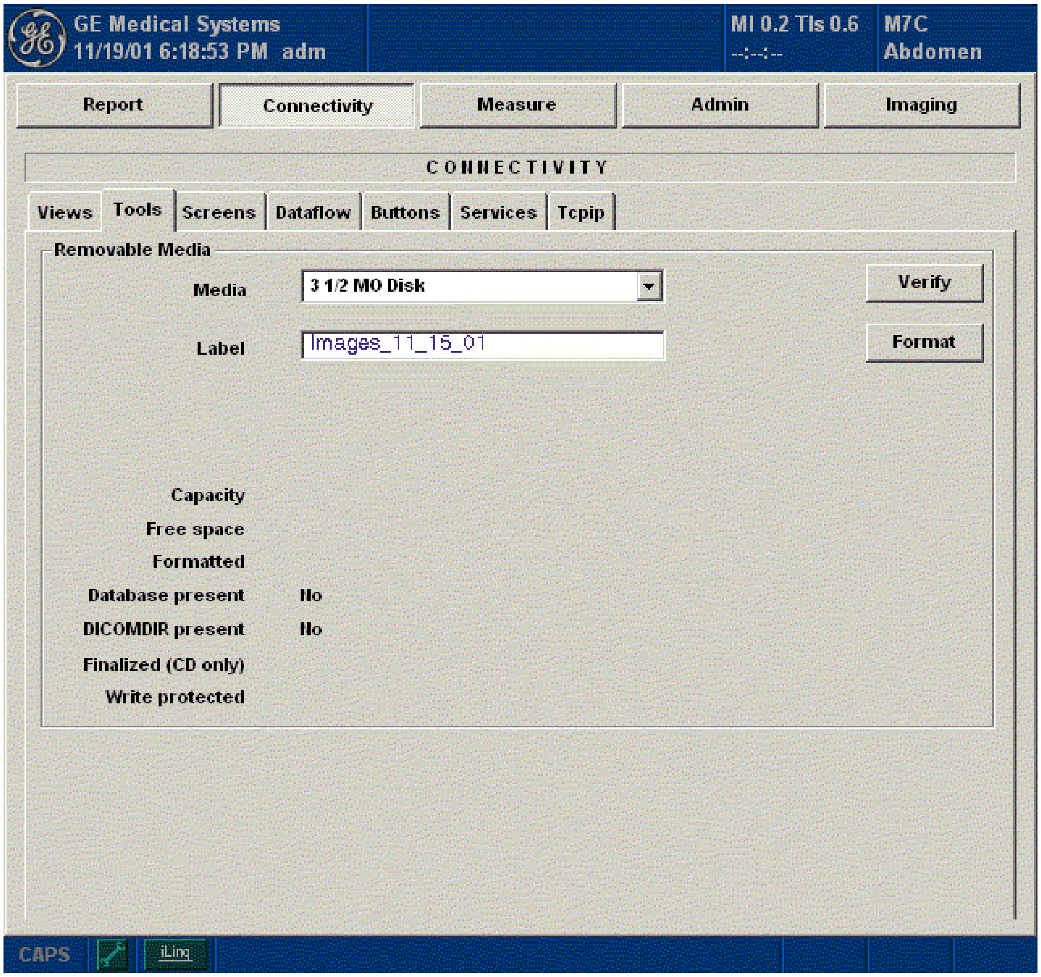
6.) Please wait for the patient information to be copied to this Ultrasound system. Informational messages appear while the import is taking place.

7.) Press F3 to eject the media.

8-11-3 Patient, Report, and User-Defined Backup Protocols

Back up patient data AFTER you've archived (moved) images so that the pointers to the patient's images reflect that the images have been moved to removable media and are no longer on the hard drive.

1.) Insert the backup media. Format the backup media, CD-ROM or MOD. Select the Utility tab on the Measurement Selection Menu. Select Connectivity, then Tools. Label the media.

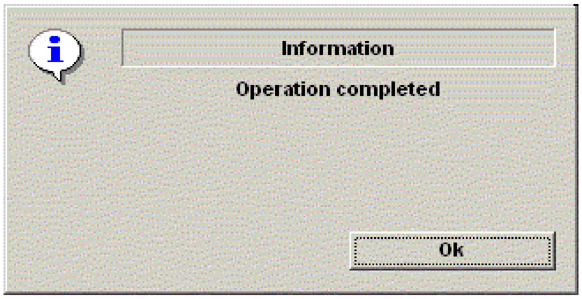


Media: 3 1/2 MO Disk
Label: Images_11_15_01
Capacity
Free space
Formatted
Database present: No
DICOMDIR present: No
Finalized (CD only)
Write protected

Figure 8-60 Format MOD/CD-ROM Screen

2.) The Ultrasound system displays a pop-up menu when the formatting has been completed. Press Ok to continue.Verify that the format was successful.

8-11-3 Patient, Report, and User-Defined Backup Protocols (cont'd)

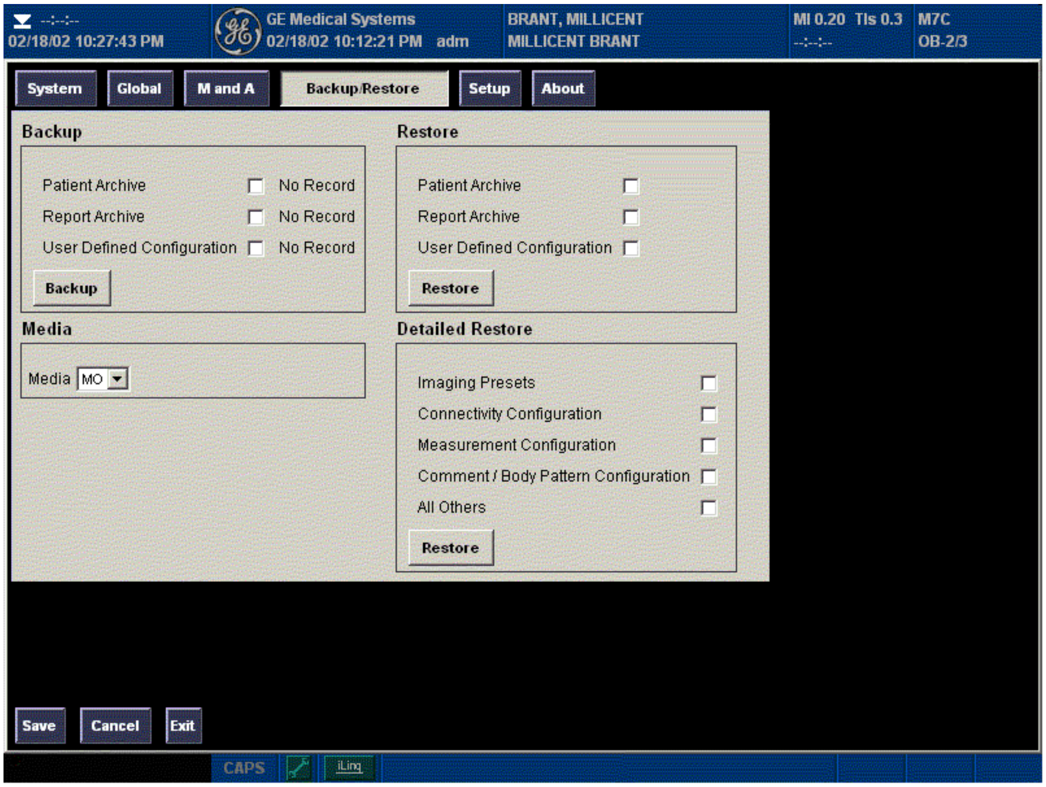

Information

Operation completed

Figure 8-61 Format Successful Pop-up Menu

3.) Select the Utility tab on the Measurement Selection Menu. Select System, then Backup/Restore.

4.) Select everything under Backup by placing a check mark in front of Patient Archive, Report Archive, and User Defined Configuration. Then press Backup.


--:--:--
02/18/02 10:27:43 PM
GE Medical Systems
02/18/02 10:12:21 PM adm
BRANT, MILLICENT
MILLICENT BRANT
MI 0.20 TIs 0.3
--:--:--
M7C
OB-2/3

Backup
Patient Archive ☐ No Record
Report Archive ☐ No Record
User Defined Configuration ☐ No Record

Restore
Patient Archive ☐
Report Archive ☐
User Defined Configuration ☐

Media
Media MO

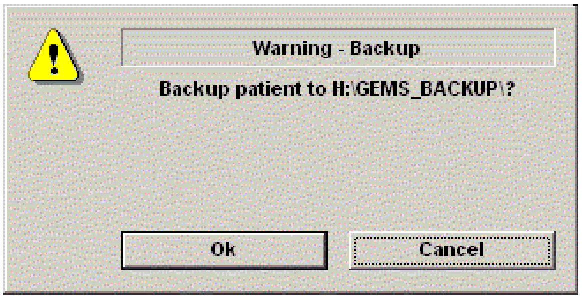
Detailed Restore
Imaging Presets ☐
Connectivity Configuration ☐
Measurement Configuration ☐
Comment / Body Pattern Configuration ☐
All Others ☐

Figure 8-62 Backup Menu

NOTE: The detailed section of this menu decouples the user defined configuration above. This allows you to selectively restore what you want to restore across multiple machines. Refer to Chapter 16 for more information.

8-11-3 Patient, Report, and User-Defined Backup Protocols (cont'd)

5.) Answer 'Ok' to the following pop-up message as many times as the number of items you are backing up.



Warning - Backup

Backup patient to H:\GEMS_BACKUP\?

Figure 8-63 Back-up Confirmation Message

NOTICE DO NOT use the following special characters when saving images: slash (/), dash (-), or asterisk (*).

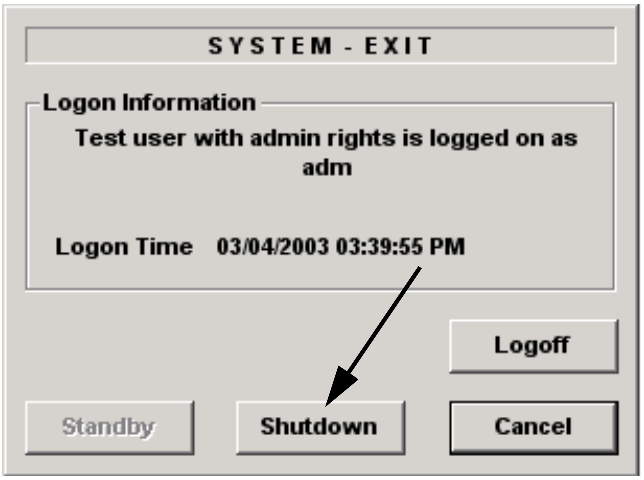
Section 8-12
Loading Base Image Software

NOTE: While it is believed to be unnecessary, It would not hurt to disconnect the system from the network and remove all transducers.

NOTE: If the user has an HP990, HP970, UP-D50, UP-D895, UP-D21 or Talley printers, connect the printer and turn it on. If a printer is plugged in at this time it will automatically install and you won't have to go back to windows to install it.

NOTE: If the system has any digital peripherals, be sure that they are turned on.

1.) Insert the disk labeled "Base System Software Load Image" into the CDROM drive.
2.) Properly turn off the scanner by momentarily pressing the Standby (ON/OFF) Switch. Select Shutdown from the System Exit menu. Wait for the Standby Switch to turn amber.
3.) If the system will not shutdown normally, hold down the Standby Switch until the light turns from green to amber.



SYSTEM - EXIT

Logon Information

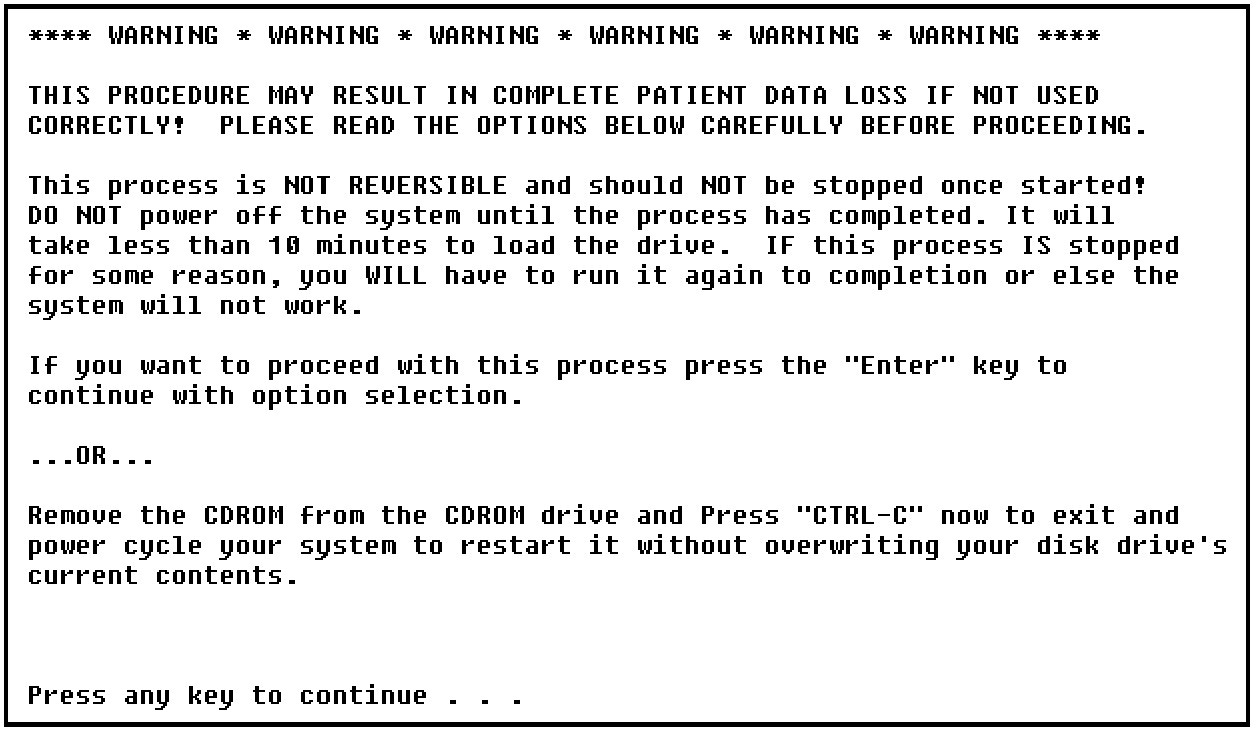
Test user with admin rights is logged on as adm

Logon Time 03/04/2003 03:39:55 PM

Figure 8-64 Shutdown Dialog Box

4.) Turn on the scanner. You will see a message displayed on the Touch Panel screen as shown in Figure 8-65 on page 8-60 .

Section 8-12 Loading Base Image Software (cont'd)



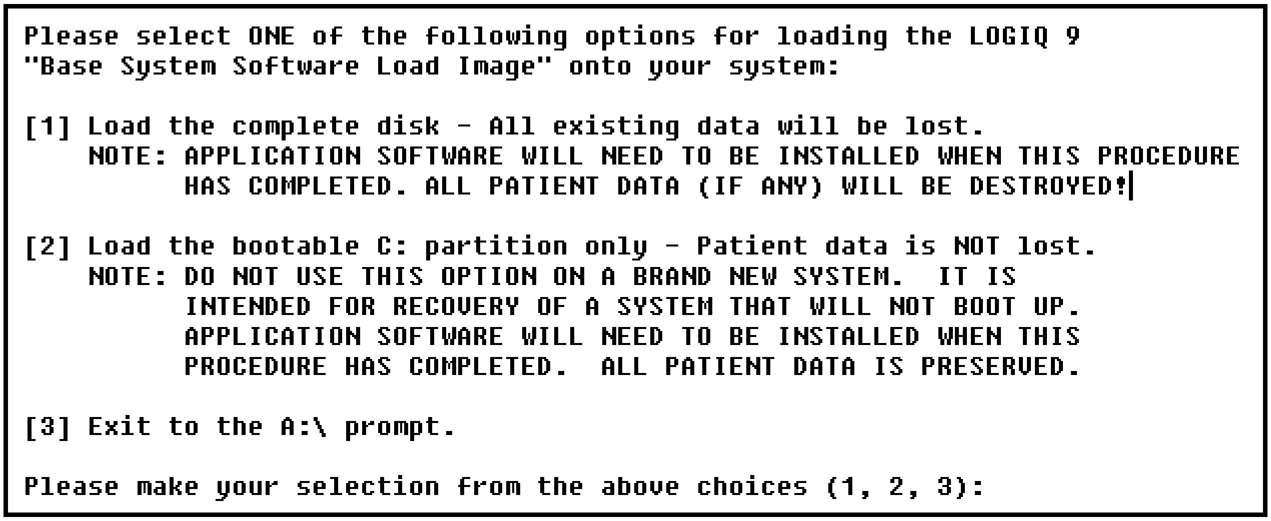
```
**** WARNING * WARNING * WARNING * WARNING * WARNING * WARNING ****

THIS PROCEDURE MAY RESULT IN COMPLETE PATIENT DATA LOSS IF NOT USED
CORRECTLY!  PLEASE READ THE OPTIONS BELOW CAREFULLY BEFORE PROCEEDING.

This process is NOT REVERSIBLE and should NOT be stopped once started!
DO NOT power off the system until the process has completed. It will
take less than 10 minutes to load the drive.  IF this process IS stopped
for some reason, you WILL have to run it again to completion or else the
system will not work.

If you want to proceed with this process press the "Enter" key to
continue with option selection.

...OR...

Remove the CDROM from the CDROM drive and Press "CTRL-C" now to exit and
power cycle your system to restart it without overwriting your disk drive's
current contents.



Press any key to continue . . .
```

Figure 8-65 Base Load Warning Message

Now is your chance to abort the Base Image load or continue.

5.) Press any key to continue. To abort, remove the CD-ROM from the drive and press **CTRL-C**.

Section 8-12 Loading Base Image Software (cont'd)



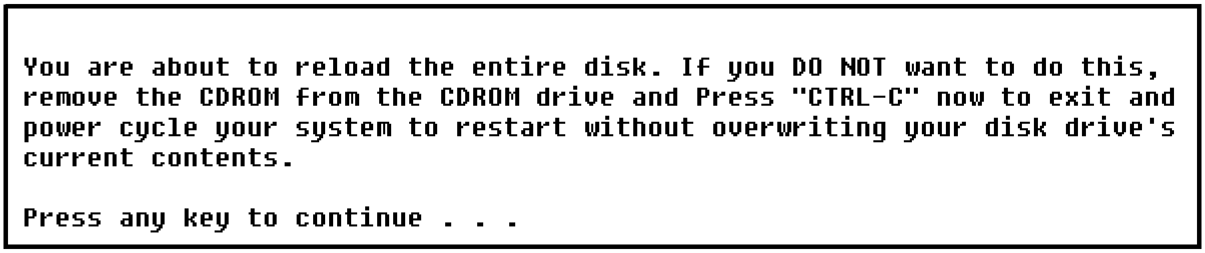
```
Please select ONE of the following options for loading the LOGIQ 9
"Base System Software Load Image" onto your system:

[1] Load the complete disk - All existing data will be lost.
    NOTE: APPLICATION SOFTWARE WILL NEED TO BE INSTALLED WHEN THIS PROCEDURE
          HAS COMPLETED. ALL PATIENT DATA (IF ANY) WILL BE DESTROYED!

[2] Load the bootable C: partition only - Patient data is NOT lost.
    NOTE: DO NOT USE THIS OPTION ON A BRAND NEW SYSTEM.  IT IS
          INTENDED FOR RECOVERY OF A SYSTEM THAT WILL NOT BOOT UP.
          APPLICATION SOFTWARE WILL NEED TO BE INSTALLED WHEN THIS
          PROCEDURE HAS COMPLETED.  ALL PATIENT DATA IS PRESERVED.

[3] Exit to the A:\ prompt.

Please make your selection from the above choices (1, 2, 3):
```

Figure 8-66 Base Load Option Screen

The first choice is to load the complete hard drive.

1.) Load the complete disk - All existing data will be lost.

NOTE: APPLICATION SOFTWARE WILL NEED TO BE INSTALLED WHEN THIS PROCEDURE HAS COMPLETED. ALL PATIENT DATA (IF ANY) WILL BE DESTROYED!



```
You are about to reload the entire disk. If you DO NOT want to do this,
remove the CDROM from the CDROM drive and Press "CTRL-C" now to exit and
power cycle your system to restart without overwriting your disk drive's
current contents.

Press any key to continue . . .
```

Figure 8-67 Base Load Option 1 Message

Figure 8-67 is the last warning message before the complete base load process begins. Press any key to continue or abort by pressing **CTRL-C**.

Section 8-12 Loading Base Image Software (cont'd)

The second choice is to load only the bootable portion of the hard drive partition, the “C” partition. This is not an option for a new hard drive that has not been previously partitioned for proper LOGIQ 9 operation.

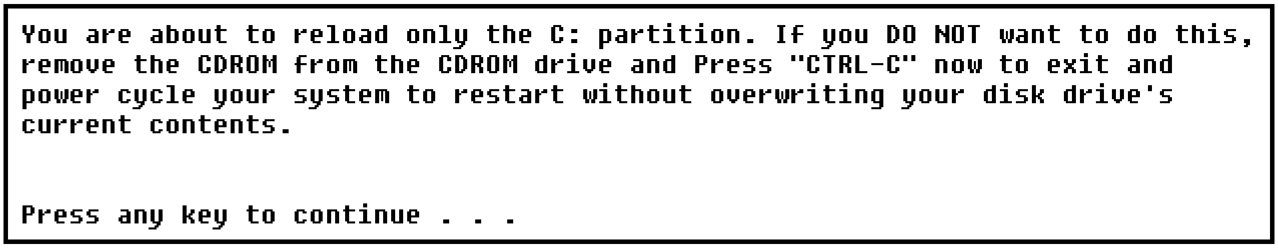
2.) Select [2} Load the bootable C: partition only - Patient data is NOT lost.

NOTE: *DO NOT USE THIS OPTION ON A BRAND NEW SYSTEM. IT IS INTENDED FOR RECOVERY OF A SYSTEM THAT WILL NOT BOOT UP. APPLICATION SOFTWARE WILL NEED TO BE INSTALLED WHEN THIS PROCEDURE HAS COMPLETED. ALL PATIENT DATA IS PRESERVED.*

This selection will leave the remaining drive partitions intact.

Table 8-7 LOGIQ 9 Drive Partition and Usage

Drive Partition	Usage
C	System Files and Applications
D	User Define and Presets
E	Patient Archive Data
F	File Swap Area



```
You are about to reload only the C: partition. If you DO NOT want to do this,
remove the CDROM from the CDROM drive and Press "CTRL-C" now to exit and
power cycle your system to restart without overwriting your disk drive's
current contents.


Press any key to continue . . .
```

Figure 8-68 Base Load Option 2 Message

Figure 8-68 is the last warning message before the base load process begins. Press any key to continue or abort by pressing **CTRL-C**.

The third choice,

3.) Exit to the A:\ prompt. Is intended for manufacturing use only.

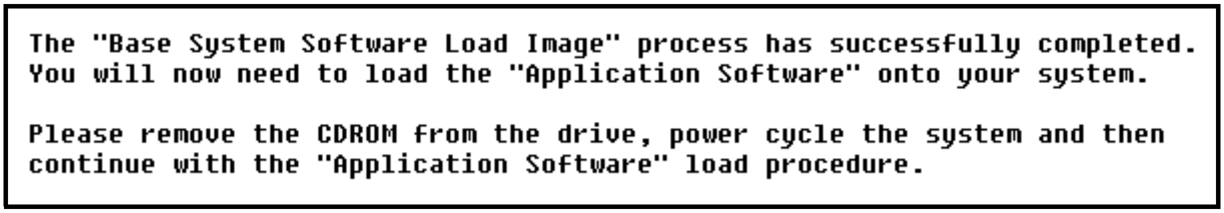
This is **NOT** an option as it is intended for manufacturing use only.

If you select Option 3 by mistake, power cycle the system. Hold down the Standby switch until the light turns amber then turn the system back on.

Section 8-12 Loading Base Image Software (cont'd)

Once you have chosen to continue with Option 1 or Option 2, you will see a screen showing Norton Ghost. This automatically loads a base set of software onto the hard disk. Let it run to completion (Approximately 8-10 mins).

A message, as shown in Figure 8-69, will be displayed when the process is complete.



```
The "Base System Software Load Image" process has successfully completed.
You will now need to load the "Application Software" onto your system.

Please remove the CDROM from the drive, power cycle the system and then
continue with the "Application Software" load procedure.
```

Figure 8-69 Base Load Complete

NOTE: *IMPORTANT ... With the clinical version of Base Image Software you will see an error message "Not Ready Error Reading from Drive A" Ignore this message and continue.*

4.) Remove the CD-ROM

NOTE: *Remove the CD-ROM from the drive; otherwise you will be repeating the Base System Software Load process when the system boots up.*

5.) After removing the CDROM from the drive, properly turn off the scanner by holding down the Standby Switch until the light turns amber.

6.) Turn the scanner back on. It will now boot up and automatically log on to start checking hardware and mapping disk drives. This is a normal and should be allowed to run to completion.

NOTE: ***While the script is running, several windows or dialog boxes will appear on the screen. At times it may look like the system is unresponsive. Wait for the "System Settings Change"dialog box "Do You Want to Restart computer now" to appear, approximately 3-4 minutes after the desktop is displayed.***

NOTE: ***Prior to the System Settings Change dialog box, Do NOT touch the system during this process. Activating the keyboard, mouse or front panel could corrupt the installation.***

7.) When you get a message to restart Windows, select YES.

8.) Allow the system to reboot.

9.) The system will come up into the Windows mode.

Section 8-12 Loading Base Image Software (cont'd)

8-12-1 System Checks

1.) From the Windows mode display, double-click (**RIGHT SET** key) on the My Computer icon.
2.) Check the drive letter assignments for the Compact Disk and Removable Disk. They should be Compact Disk (G) and Removable Disk (H).
3.) If the Drive letter assignments are properly mapped, proceed to loading applications software. If the assignments are reversed, proceed to remap the drives manually.
4.) If the customer has a **USB (Digital Priters)** to be install, plug it in now. The system is still in Windows mode and should recognize the printer and install the necessary driver. If you do not install the printer until after the Applications software has been loaded, you will need a service dongle to get into windows and manually install the printers. Print a test page to check the printer installation.

NOTE: If the printer is installed while in application mode, excessive CPU time will be consumed and the system will become very slow to unusable. Shutting down and rebooting will clear the condition. The printer will function correctly.

5.) Check your Service Dongle. Plug in your Service Dongle to ensure that it is recognized and lights up.

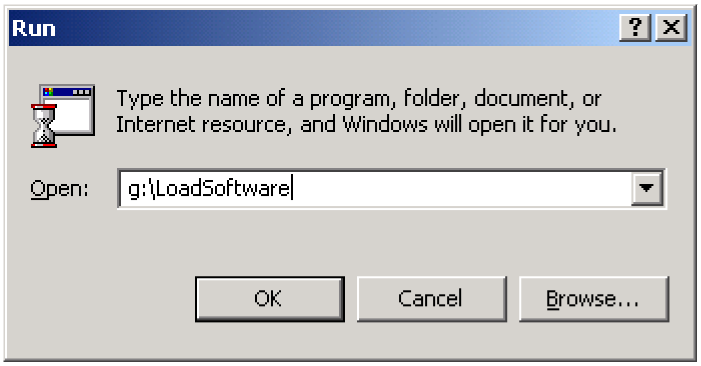
Section 8-13
Loading Application Software

8-13-1 Loading Applications Software

NOTE: *If you have not done so previously, double-click on the My Computer icon. Check for the drive letters assignments of the Removable Drive (MOD) and the CD-ROM Drive. If the CD-ROM Drive is not drive “g” and the MOD drive “h” , manually remap the drives.*

NOTE: *When installing R2.1.1 software you may see error messages about not being able to replace the following *.dll files: **ginastub.dll** and **msvcr70.dll**. These are known, non-critical issues that are being tracked and will be fixed in the next revision of software.*

1.) Place the “Application Software” CDROM into the CDROM drive.
2.) Select the START button on the tool bar at the bottom of the LCD screen and select “**Run…**”.
3.) Enter “**g:\LoadSoftware**” into the dialog box as shown in Figure 8-70.



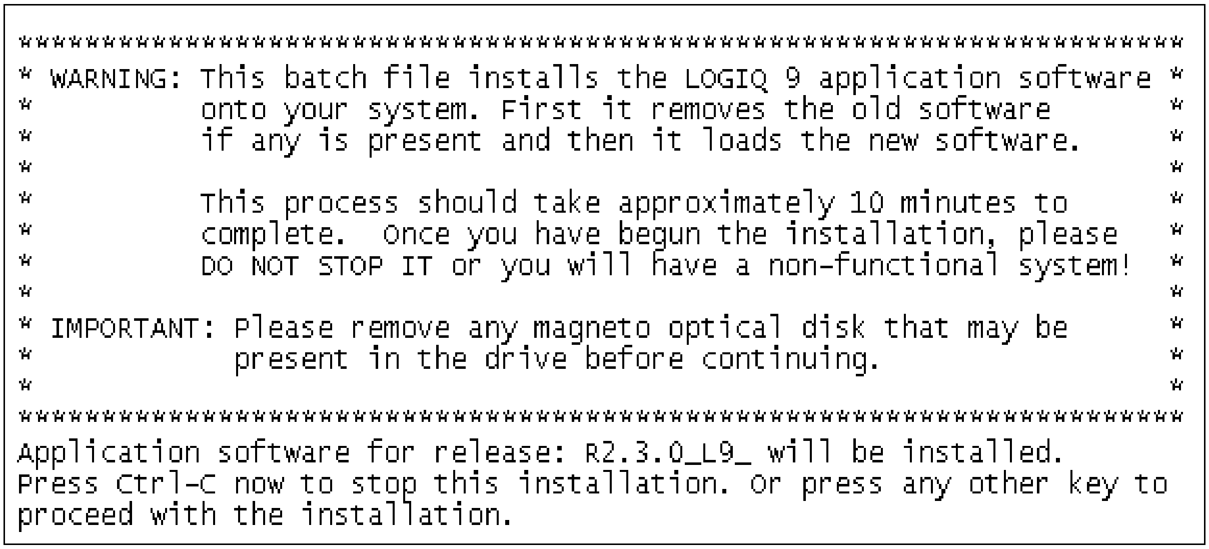
Type the name of a program, folder, document, or Internet resource, and Windows will open it for you.

Open: g:\LoadSoftware

Figure 8-70 Run Load Software

4.) You will see a screen that warns you that you are about to load software, press the Enter key or select OK to start the process.
5.) You will see a Command (CMD) window open as shown in Figure 8-71.

8-13-1 Loading Applications Software (cont'd)

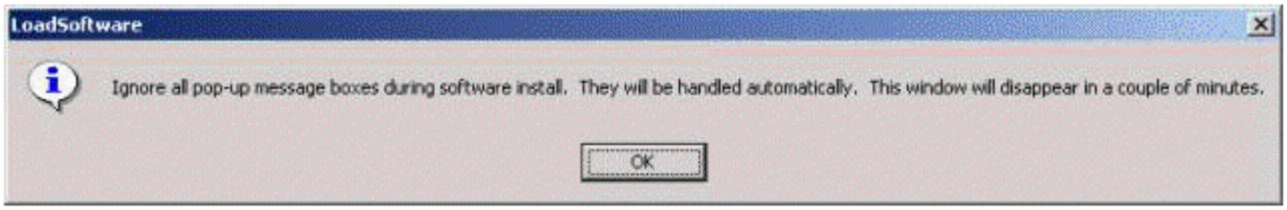


```
**********************************************************************
* WARNING: This batch file installs the LOGIQ 9 application software *
*          onto your system. First it removes the old software       *
*          if any is present and then it loads the new software.    *
*                                                                    *
*          This process should take approximately 10 minutes to      *
*          complete.  Once you have begun the installation, please  *
*          DO NOT STOP IT or you will have a non-functional system!  *
*                                                                    *
* IMPORTANT: Please remove any magneto optical disk that may be      *
*            present in the drive before continuing.                 *
*                                                                    *
**********************************************************************
Application software for release: R2.3.0_L9_ will be installed.
Press Ctrl-C now to stop this installation. Or press any other key to
proceed with the installation.
```

Figure 8-71 Command Window

6.) As indicated, press any key to continue. The process is completely automated and provides you with messages as to its status. R2.1.1 Software provides the message in Figure 8-72.

At this point you just have to wait while the software loads (Approximately 7-8 minutes).



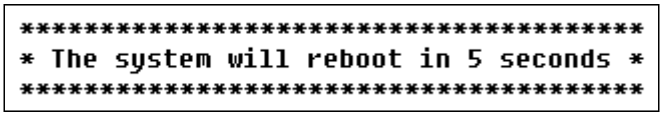
Ignore all pop-up message boxes during software install. They will be handled automatically. This window will disappear in a couple of minutes.

Figure 8-72 R2.1.1 Software Message

NOTE: *When the Information Window appears asking you to select OK, do nothing. This window will disappear automatically.*

8-13-1 Loading Applications Software (cont'd)

7.) When the process has completed, the window will turn dark red and you will see the following message in Figure 8-73.



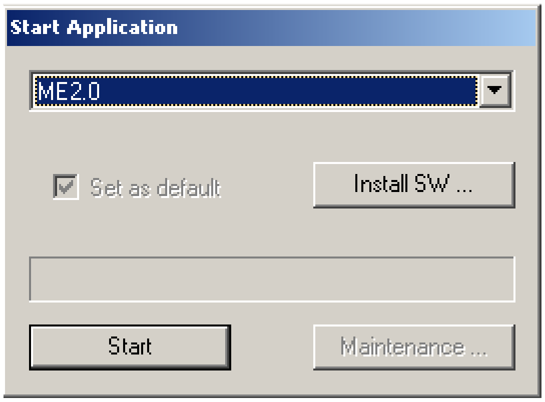
```
****************************************
* The system will reboot in 5 seconds *
****************************************
```

Figure 8-73 Software Load Complete

8.) When it completes loading the system will reboot.

If possible while the system is rebooting remove the CD from the drive. If the CD is remove the system will automatically reboot into the applications software.

If you didn't remove the CD, don't worry you will get a dialog box as in Figure 8-74.



Start Application

ME2.0

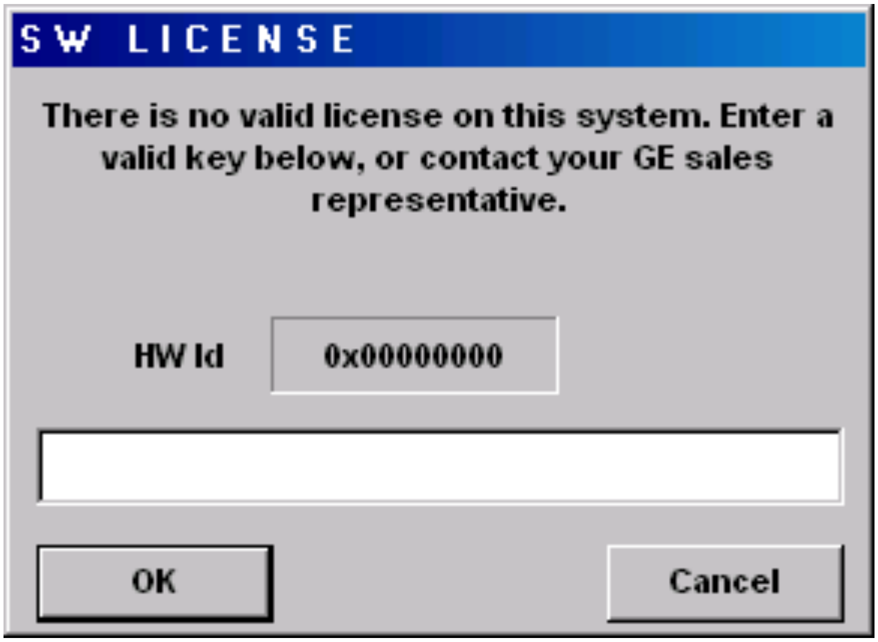
☑ Set as default

Figure 8-74 Start Software

9.) REMOVE the Applications CD

10.)From the Start Applications dialog box, select START.

11.)Select CANCEL.



SW LICENSE

There is no valid license on this system. Enter a valid key below, or contact your GE sales representative.

HW Id 0x00000000

Figure 8-75 Enter Option String

12.) During the reboot process, the system may ask for the option string (valid license) to be entered. When this happens, enter the option string provided in the installation paperwork.

NOTE: *Starting with R3.x Software, all systems must have at least the basic option string in order for the software to run. Any single option string may enable multiple options (i.e. Basic & B-Flow).*

Demo option strings turn on all options for a limited period of time. Do Not leave a demo option string in a unit when it is sold to a customer. The current R3.x Demo Option String expires 31 January, 2005.

Section 8-14
Upgrading Application Software

8-14-1 Applications Software Upgrade Procedure

NOTE: *When installing software you may see error messages about not being able to replace the following *.dll files:* ***ginastub.dll*** *and* ***msvcr70.dll****. These are known, non-critical issues that are being tracked and will be fixed in the next revision of software.*

⚠ **WARNING** ***While the software install procedure is designed to preserve data, you should save any patient data, images, system setups to a MOD or hardcopy.***

⚠ **CAUTION** **Remember to remove the MOD before continuing with the software install.**

1.) Place the "Application Software" CD-ROM into the CD-ROM drive.
2.) Power Down the scanner.
3.) Power up the scanner. Wait for a dialog box like the one in Figure 8-76.

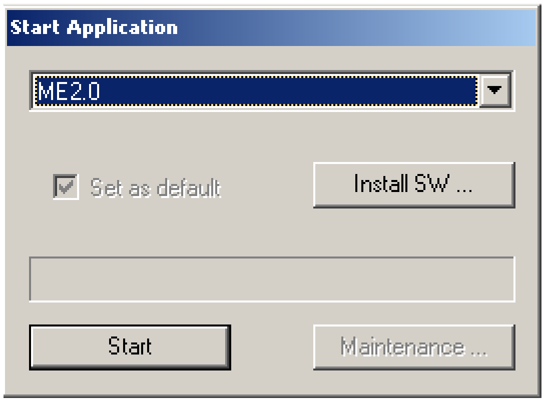
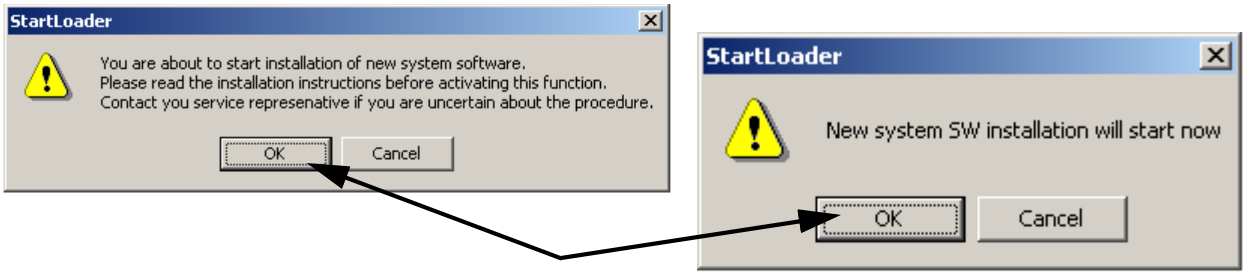


Figure 8-76 Start Application Window

8-14-1 Applications Software Upgrade Procedure (cont'd)

4.) Select INSTALL SW ... .

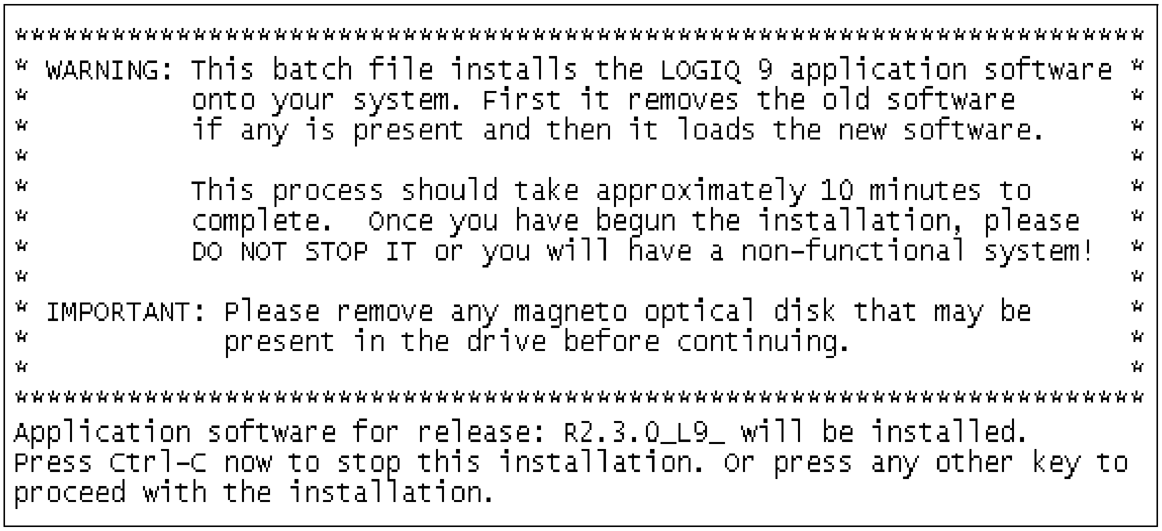
5.) There will be two dialog boxes popping up warning you that you are about to install new software as shown in Figure 8-77. In both cases click OK.



You are about to start installation of new system software.
Please read the installation instructions before activating this function.
Contact you service represenative if you are uncertain about the procedure.

New system SW installation will start now

Figure 8-77 StartLoader Dialog Boxes



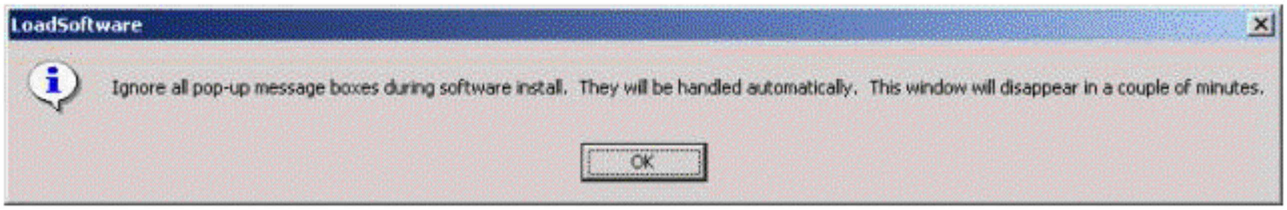
```
*************************************************************************
* WARNING: This batch file installs the LOGIQ 9 application software *
*          onto your system. First it removes the old software       *
*          if any is present and then it loads the new software.     *
*                                                                    *
*          This process should take approximately 10 minutes to      *
*          complete.  Once you have begun the installation, please   *
*          DO NOT STOP IT or you will have a non-functional system!  *
*                                                                    *
* IMPORTANT: Please remove any magneto optical disk that may be      *
*              present in the drive before continuing.               *
*                                                                    *
*************************************************************************
Application software for release: R2.3.0_L9_ will be installed.
Press Ctrl-C now to stop this installation. Or press any other key to
proceed with the installation.
```

Figure 8-78 Command Window

6.) Another window will be displayed asking you to “Press any key to continue…”.

8-14-1 Applications Software Upgrade Procedure (cont'd)

7.) As indicated, press any key to continue. The process is completely automated and provides you with messages as to its status. R2.1.0 Software provides the message in Figure 8-79.



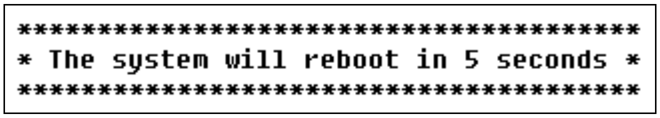
LoadSoftware

Ignore all pop-up message boxes during software install. They will be handled automatically. This window will disappear in a couple of minutes.

Figure 8-79 R2.1.0 Software Message

At this point you just have to wait while the software loads (Approximately 10 minutes).

When the process has completed, the window will turn dark red and you will see the following message in Figure 8-80.



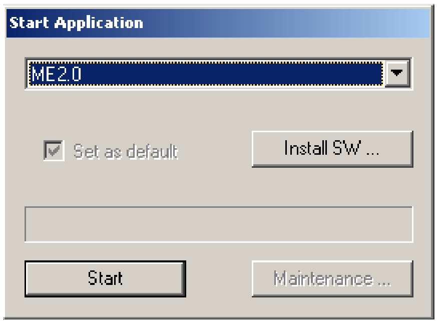
```
****************************************
* The system will reboot in 5 seconds *
****************************************
```

Figure 8-80 Software Load Complete

8.) When it completes loading the system will reboot.

9.) Remove the CD from the drive

If possible, while the system is rebooting remove the CD from the drive. If you didn't do that don't worry you will get a dialog box like the one shown in Figure 8-81.



Start Application

ME2.0

☑ Set as default

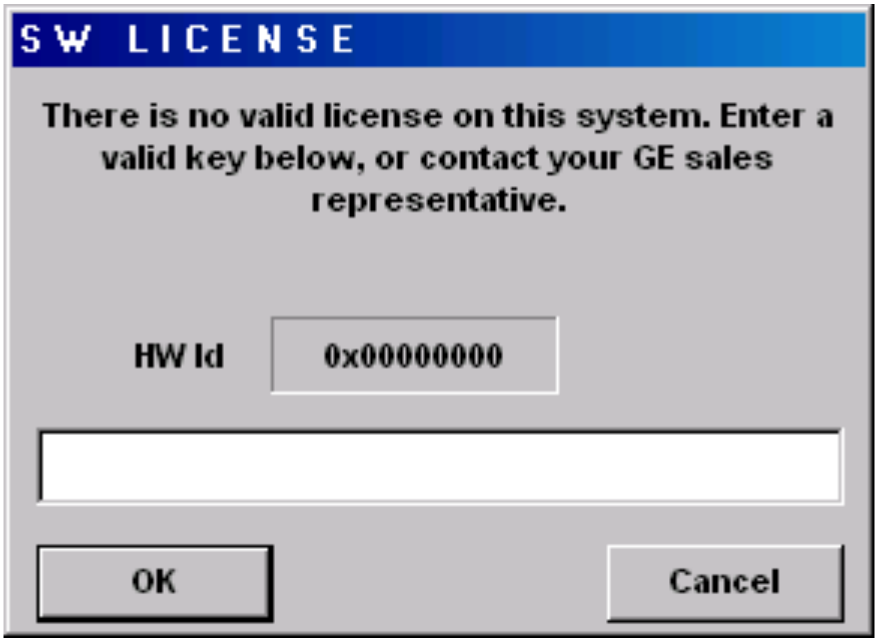
Figure 8-81 Start Software

10.)REMOVE the Applications CD

11.)From the Start Applications dialog box, select START.

12.)Select CANCEL.

8-14-1 Applications Software Upgrade Procedure (cont'd)



There is no valid license on this system. Enter a valid key below, or contact your GE sales representative.

HW Id 0x00000000

Figure 8-82 Enter Option String

13.) During the reboot process, the system may ask for the option string (valid license) to be entered. When this happens, enter the option string provided in the installation paperwork.

NOTE: Starting with R3.x Software, all systems must have at least the basic option string in order for the software to run. Any single option string may enable multiple options (i.e. Basic & B-Flow).

Demo option strings turn on all options for a limited period of time. Do Not leave a demo option string in a unit when it is sold to a customer. The current R3.x Demo Option String expires 31 January, 2005.

Section 8-15
System Setup

8-15-1 To Complete the System Setup

1.) From the Touch Screen on the scanner, select *Utility>Connectivity>TCPIP Tab*.

2.) Ensure that DHCP is deselected so you can enter information manually.

3.) Input the DICOM information.

- * This should be the appropriate DICOM information for the system if it is on the hospital network. If it is not correct, input the correct data.

4.) After all information is entered select SAVE SETTINGS.

5.) If the system is **NOT** on a network you will need to input a set of "dummy" data for proper InSite and Diagnostic operation. Enter the following data if you are not on a network:

- * Computer Name:
- * IP Address: 3.192.28.253
- * Subnet Mask: 255.255.255.0

6.) After all information is entered select SAVE SETTINGS.

7.) iLinq Checkout will need to be completed again. refer to the iLinq Installation Manual.

8-15-2 VCR Setup

1.) Reset the VCR and choose a Default Line Printer by going to *Utilities>System>Peripherals*.

2.) Under VCR, Select *Sony 9500 VCR* and SAVE

3.) Under SETUP, Select the desired default line printer and SAVE

4.) Select *Exit* in the lower left-hand corner of the Touch Screen.

8-15-3 Printer Setup

1.) If the customer has a **USB (Digital) Printer** plug it in now. The system is in Windows mode it should recognize the printer and install the necessary driver.

2.) If you do not install the printer until after the Applications software has been loaded, you will need a service dongle to get into windows and follow the manual set up procedures in the LOGIQ™ 9 Peripheral Installation Manual 2341053-100.

8-15-4 Print Key Assignment and Checkout

Because of the addition of more printer choices, digital and analog, the factory default print key configuration has been removed for the color and b/w printers.

1.) Determine which printers are configured on the system. The former factory defaults were Color = P3 and B/W = P2.

2.) Consult the customer to ensure which “Print” keys (P1-4) should be assigned to printers.

3.) Select Utility > Admin > Connectivity > Buttons >. Choose the desired print button. Under “Destinations”, select necessary printer choice from the drop-down list.

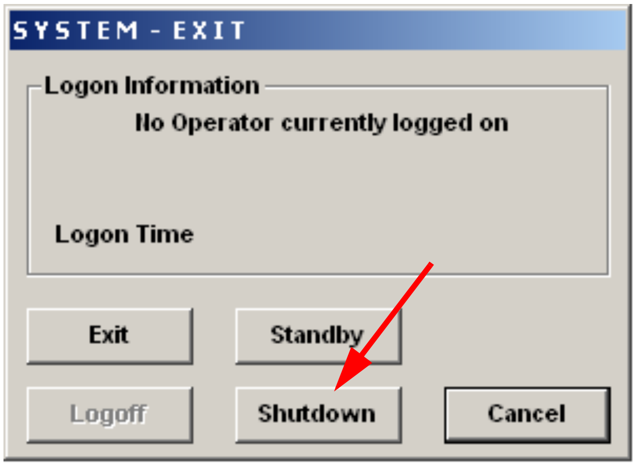
4.) Press the print key just configured and you should get a printout of the screen.

8-15-5 Restore Patient, Report, and User-Defined Presets

1.) Place the Backup/Restore media (MOD or CD-R) in the drive.
2.) Select the UTILITY tab on the Touch Panel. Select SYSTEM, then BACKUP/RESTORE.
3.) Select everything under Restore by placing a check mark after Patient Archive, Report Archive, System Configuration, and User Defined Configuration. Then press RESTORE.

8-15-6 Cycle System Power

1.) Do an auto-shut down
2.) Press the **ON/OFF** switch on the Control Panel once to display the SYSTEM - EXIT menu.
3.) Select SHUTDOWN from the SYSTEM - EXIT menu.



No Operator currently logged on

Figure 8-83 System Exit Menu for Back-end Processor Power Down

4.) Power up the system for functional check-out.

Section 8-16
Optional Software Procedures

If everything went well in the software loading process, skip this section.

While system software loading procedures are automatic, the following manual processes are provided in the unlikely event that the automatic process fails or the results are incorrect.

8-16-1 serialno.txt File Creation

With the exception of Demo Systems, if the system serial number is not set correctly the authorized options installed on the customer systems will not function.

Prior to the upgrade there is no way for the systems in the field to record the serial number of the system to the backplane. The *C:\serialno.txt* on the hard drive has been used to record the system serial number up to now.

As part of this FMI the backplane storage code is now available. After an Applications Software Upgrade, when the system is powered up, the *serialno.txt* file will be read from the hard drive and written to the backplane. This will all work well unless:

- A system Base Image Software was performed. In this case the serialno.txt file must be created and put back on the "C" drive.
    - Boot up the system with the service dongle attached to the USB port.
    - It will boot up into Windows.
    - Go to Start>Programs>Accessories>Notepad. Use Windows Notepad and type in the serial number of the system. Exactly as it is on the console rating plate. (example: **57493US2**)
    - Check the save path for this text file. Save the file **directly** to the "C:\" drive as file name *serialno.tx*t. It will **NOT** function if saved in any other location.
- There may be a rare case where the *serialno.txt* file does not contain the correct system serial number. If this is the case, repeat the previous steps to edit the *serialno.txt* file to the proper serial number.

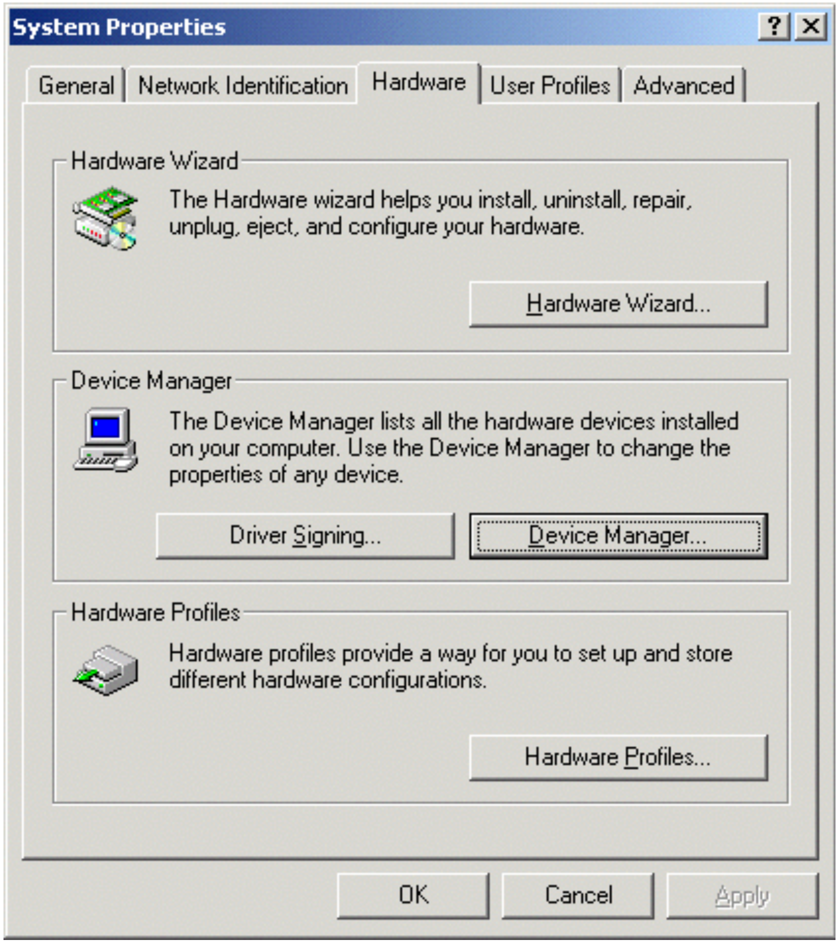
NOTE: If there is any doubt about the contents of serialno.txt, it should be checked before the application is first run, as once the serial number is written into the backplane it can only be changed with a diagnostic.

The *serialno.txt* file writes it's information into the Backplane EEPROM. If it is not done during the software load you must use the diagnostic utilities described in Chapter 7 of the Proprietary Manual to enter the Console Serial Number in the EEP-BP VPD Data.txt file.

8-16-2 Optional Check Devices

1.) On the desktop, right click on the MY COMPUTER icon, and select PROPERTIES.

2.) Select the Hardware tab, and then the DEVICE MANAGER. It may take up to a minute for the Device Manager screen to appear.



The Hardware wizard helps you install, uninstall, repair, unplug, eject, and configure your hardware.

The Device Manager lists all the hardware devices installed on your computer. Use the Device Manager to change the properties of any device.

Hardware profiles provide a way for you to set up and store different hardware configurations.

Figure 8-84 System Properties

8-16-2 Optional Check Devices (cont'd)

3.) Verify that the Device Manager appears as shown in Figure 8-85. Your display may vary.

4.) You should see no devices with question marks or other icons, **except the VIA PCI Audio Controller (WDM)**. This one device will be shown as below with a red **X** through it.

5.) There are two audio controllers. The VIA PCI Audio Controller (WDM) is disabled so that the Doppler audio works correctly through the Creative Labs SB Live series sound card.

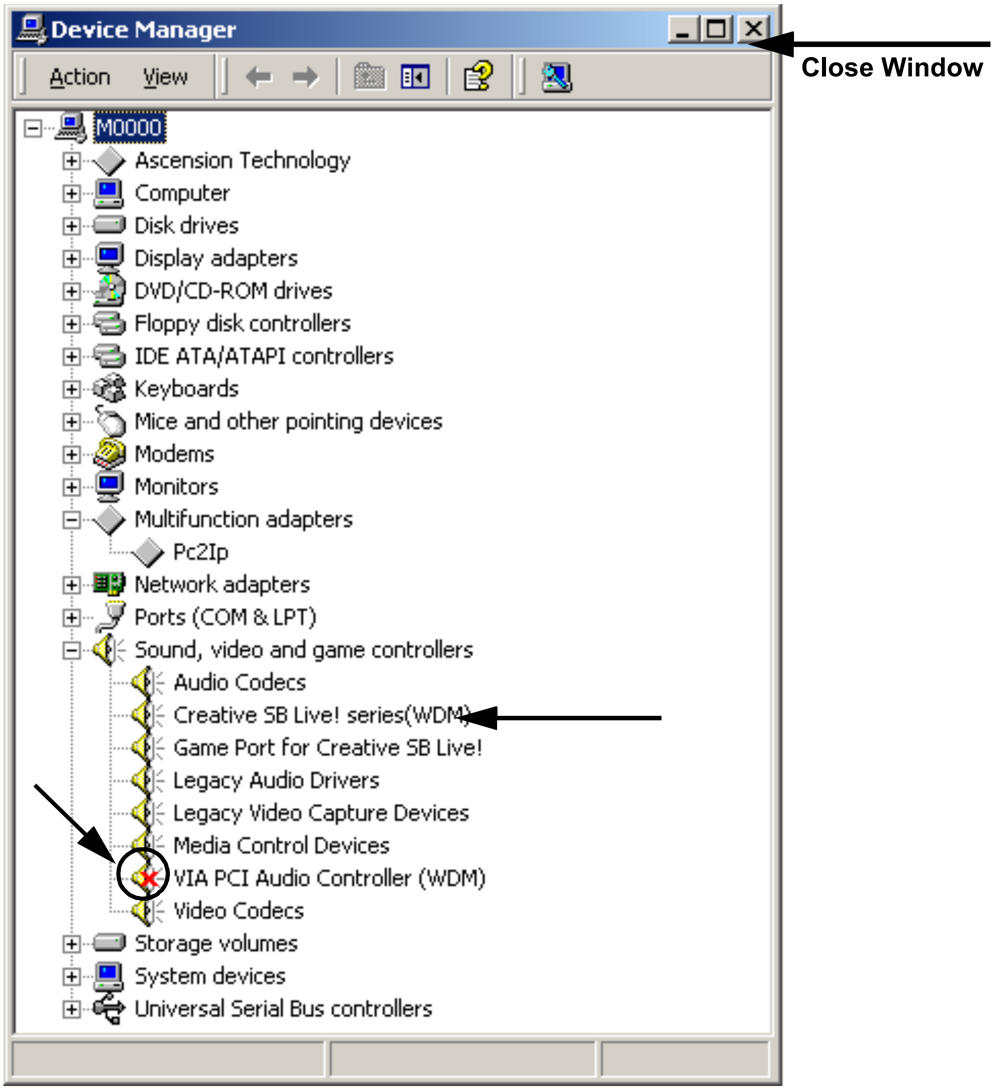


Figure 8-85 Device Manager

6.) Close the **Device Manager** window by selecting the close window X in the corner.

7.) Close the **System Properties** window by selecting the close window X in the corner.

8-16-3 Optional Procedure for Changing (Re-mapping) Drive Letters

An automated process was developed for this. It was implemented in Base Image Load -9 or later.

NOTE: *If you are using a Base Image Load of -8 or earlier, or the -9 and later Base Image Load fails to properly map the drives, prodeed with manually assigning the proper drive letters.*

1.) First check to see if you need to change the drive letters on the CDROM drive and the Magneto Optical drives – they **SHOULD** be G: and H: respectively.

2.) Right-click on the "My Computer" icon on the Windows desktop.

3.) Select "Manage" you should see a screen like Figure 8-86.

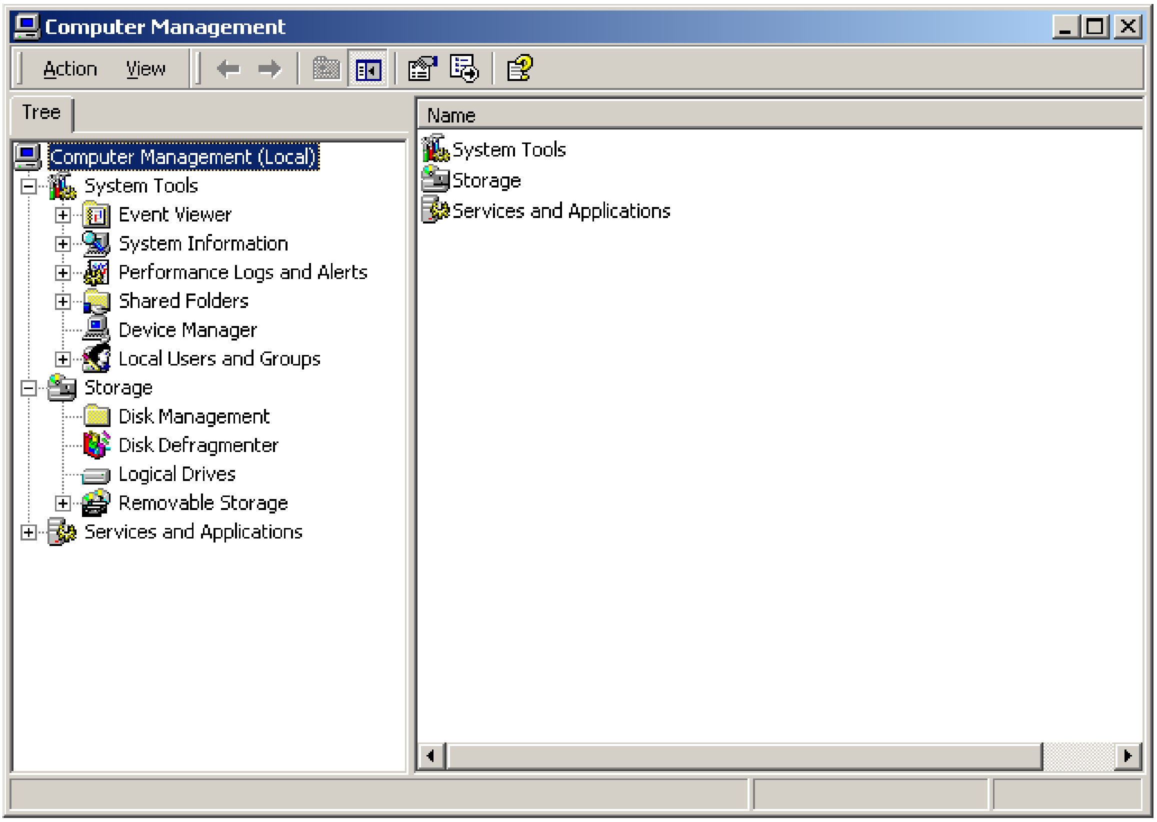
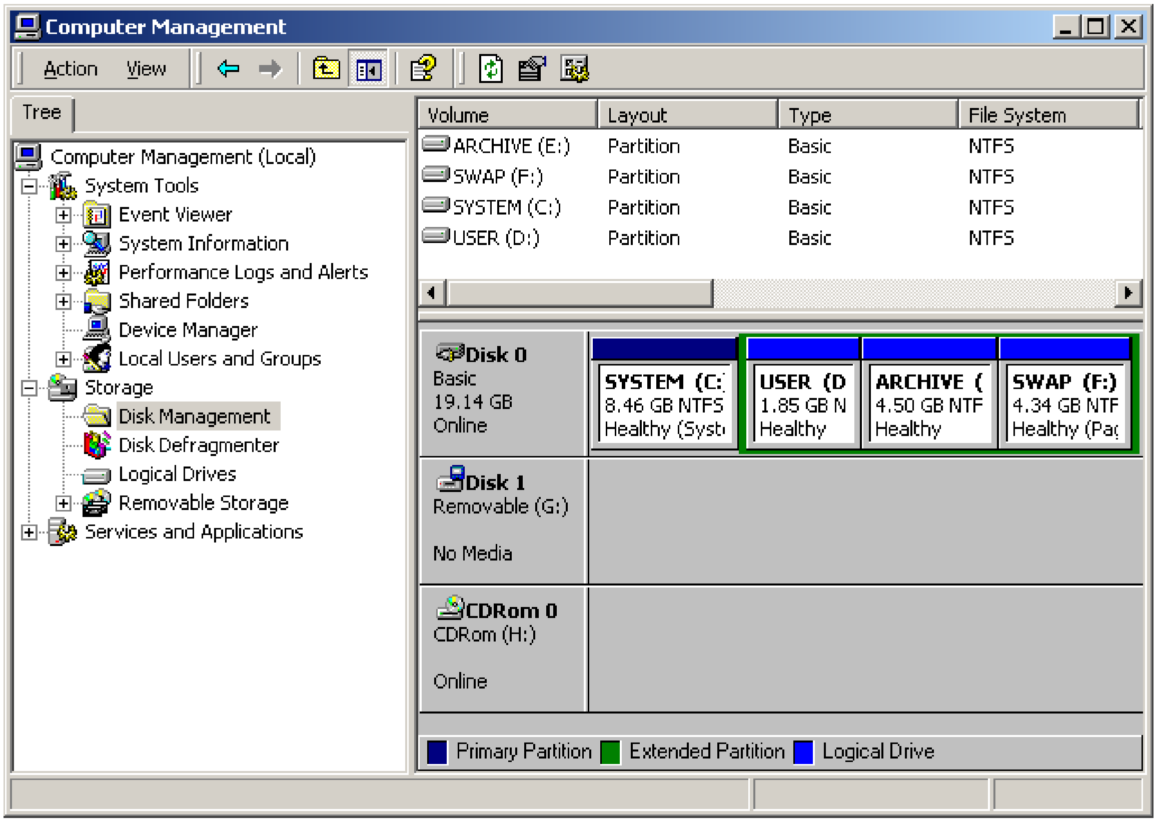


Figure 8-86 Computer Management

4.) Click on the "Disk Management" icon on the left side of the screen under "Storage". You'll see this screen like Figure 8-87.

8-16-3 Optional Procedure for Changing (Re-mapping) Drive Letters (cont'd)



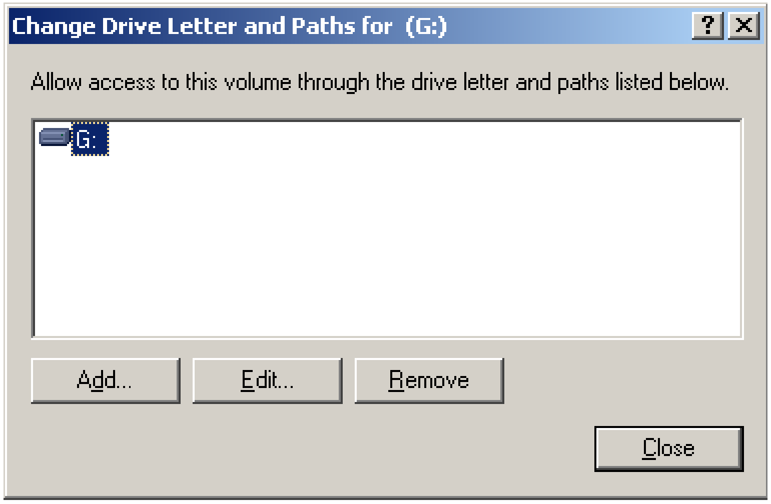
Volume	Layout	Type	File System
ARCHIVE (E:)	Partition	Basic	NTFS
SWAP (F:)	Partition	Basic	NTFS
SYSTEM (C:)	Partition	Basic	NTFS
USER (D:)	Partition	Basic	NTFS

Figure 8-87 Disk Management

5.) Notice that "**Disk 1 Removable**" is shown as drive letter "G:" and "**CD-ROM 0**" is shown as drive letter "H:" - **These are incorrect drive letters.** This procedure will show you how to change them to the proper designations which is the reverse of how they are now.

6.) Left-click on the "**Disk 1 Removable**" and select "Change Drive Letter and Path…". You'll see a screen as shown in Figure 8-88.

8-16-3 Optional Procedure for Changing (Re-mapping) Drive Letters (cont'd)

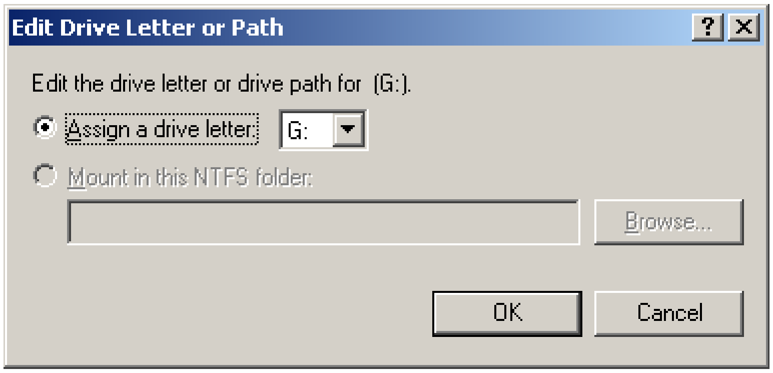

Change Drive Letter and Paths for (G:)

Allow access to this volume through the drive letter and paths listed below.

G:

Figure 8-88 Change Drive Letter and Path

7.) Right-click on "Edit…" and you'll see a screen as shown in Figure 8-89.


Edit Drive Letter or Path

Edit the drive letter or drive path for (G:).

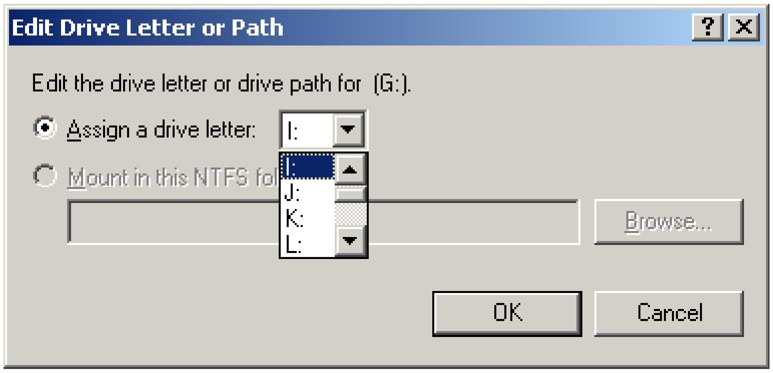
● Assign a drive letter: G:

○ Mount in this NTFS folder:

Figure 8-89 Select Drive to Assign

8.) Now Right-click on the little down arrow and you'll see the list box open with a list of available drive letters. Select the letter "I:"

8-16-3 Optional Procedure for Changing (Re-mapping) Drive Letters (cont'd)


Edit Drive Letter or Path

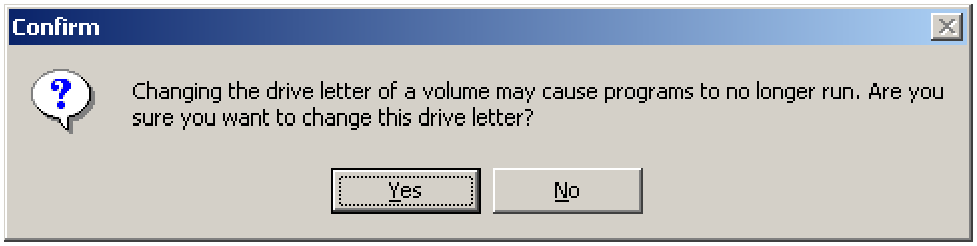
Edit the drive letter or drive path for (G:).

● Assign a drive letter: I:

○ Mount in this NTFS fol

Figure 8-90 Select Drive Letter I

9.) Now Right-click "OK". You'll see the following message as shown in Figure 8-91.


Confirm

Changing the drive letter of a volume may cause programs to no longer run. Are you sure you want to change this drive letter?

Figure 8-91 Confirm Drive Letter Change

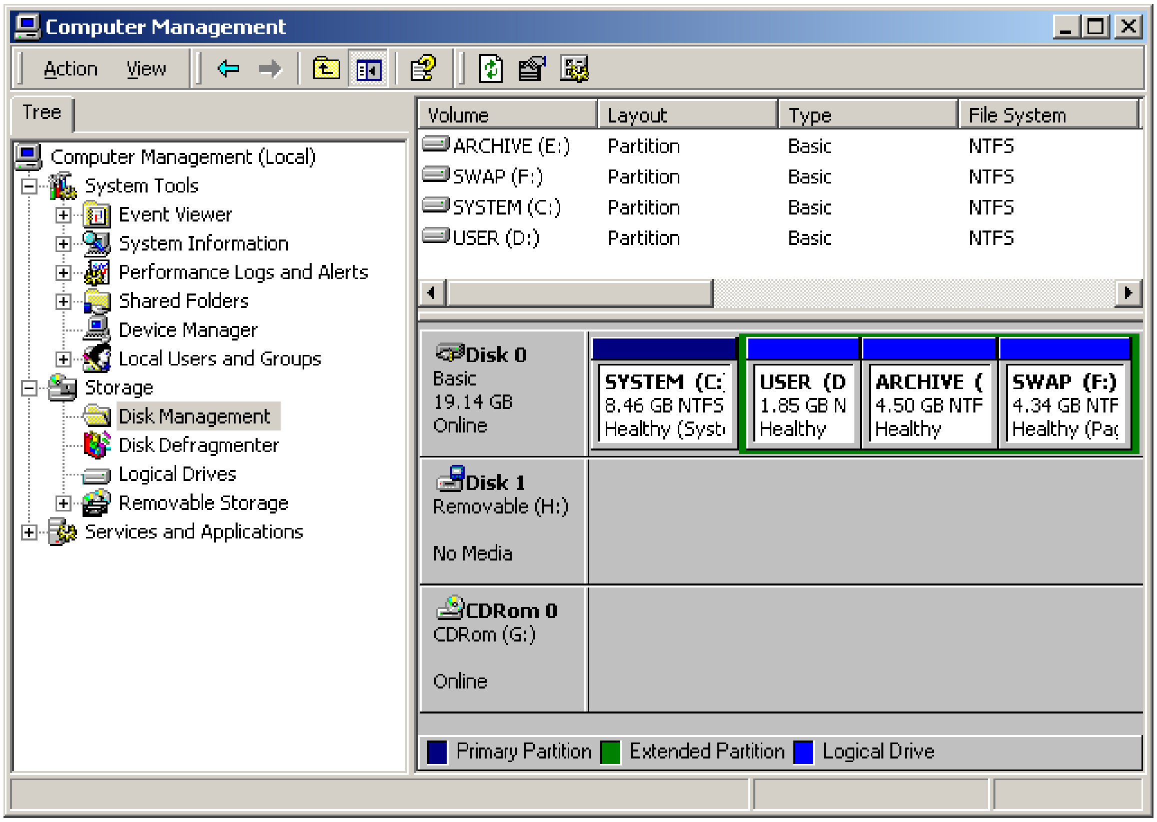
10.)Right-click "OK" to acknowledge the message.

11.)Now follow the previous steps again and change the "**CD-ROM 0**" to "**G:**".

12.)Follow the previous steps one more time to change the "**Disk 1 Removable**" to "**H:**".

13.)When you're all done the settings should look like those shown in Figure 8-92.

8-16-3 Optional Procedure for Changing (Re-mapping) Drive Letters (cont'd)



Volume	Layout	Type	File System
ARCHIVE (E:)	Partition	Basic	NTFS
SWAP (F:)	Partition	Basic	NTFS
SYSTEM (C:)	Partition	Basic	NTFS
USER (D:)	Partition	Basic	NTFS

Figure 8-92 Confirm Drive Letter Assignment

Congratulations! You've just successfully re-mapped the drive letters of the CDROM drive and Magneto Optical drive to their proper configuration.

Exit the Computer Management screen.

8-16-4 Possible Behavior of the First Power Up After Application Load

After installing the new Application Software, if a new Front Panel code is needed:

The first time the Ultrasound application (echoloader) is run after the software upgrade, the application will detect that the Front Panel code is out of date. Because the Front Panel has to have power removed and re-applied before the Front Panel code update process can continue, the application boot up will automatically shut down the LOGIQ™ 9 just before the application boot up is complete.

In some cases, the system may not shutdown automatically. If the dialog box appears, "Ending Process, Please wait...", please wait 2 minutes. If the system does not turn off, force the shut down by holding down the on/off key until the monitor turns off then let it complete the power down process.

Simply ensure the system has powered down, and the power button is amber, then restart the system to load the Ultrasound application. The auto-power down will only occur on the first power up after the application upgrade.

8-16-5 GE USB Control Panel Driver Loss

NOTE: While the loss of drivers should not happen with the current application software loading process, this section remains as a reference.

Sometimes, after loading new software (or the first time load of software), the GE Front Panel may not function after Applications (echoloader) has brought the system up in scan mode. The alpha-numeric keyboard, trackball and two set keys will function but the touch panel and all other GE controls on the operator interface will NOT function.

Watch the system closely as the system boots up. Early in the process, during the BIOS load, the front panel lights will flash yellow then green and go out. This basically means the front panel is "healthy" or functional.

During the Applications loading process of boot up, when the blue bar on the image monitor is about 2/3rds of the way complete, the front panel lights will flash again. This basically confirms USB communication with the front panel.

During the software load process, the USB driver for the GE Control Panel may get corrupted. A simple Windows Driver Upgrade (update) will cure the problem.

8-16-5 GE USB Control Panel Driver Loss (cont'd)

1.) Properly Power down the system.
2.) Ensure that your Service Dongle is installed on the USB port in the back of the system.
3.) Power up the system.
4.) Select MAINTENACE... to enter the maintenance mode.
5.) Leave the User name blank, enter the current service Password and select EXIT TO WINDOWS.
6.) Trackball to MY COMPUTER and left click.
7.) Right click on PROPERTIES
8.) Right click on the HARDWARE Tab
9.) Right Click on DEVICE MANAGER in the middle-right of the Hardware tab window.

Look through the Device Manager menu items and hardware selections for big yellow question marks or exclamation marks in a yellow oval. You should find an unknown device or a USB hardware selection that is not functioning.

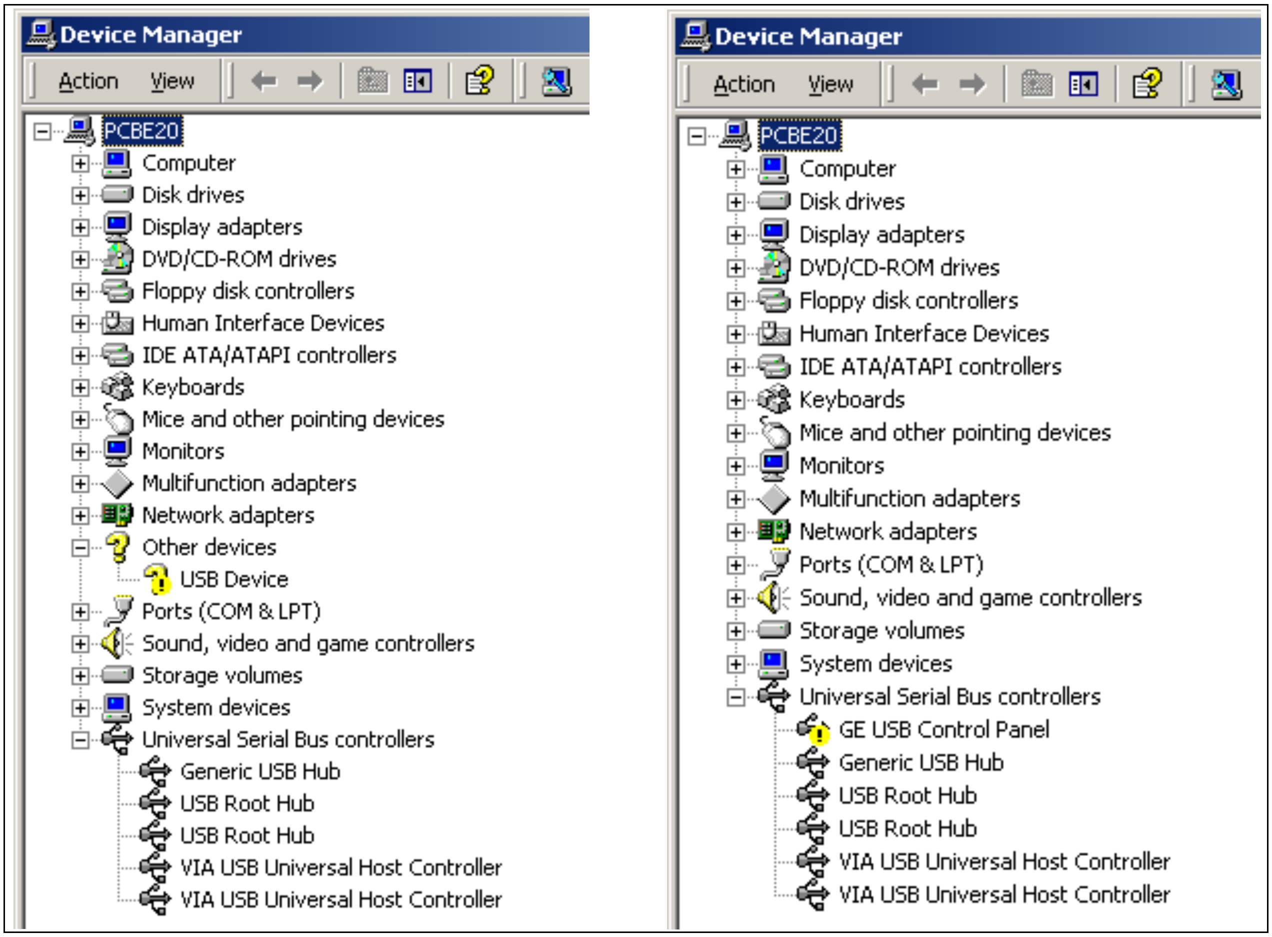


Figure 8-93 Bad USB Driver

10.) Double right click on the yellow question mark or exclamation mark.

8-16-5 GE USB Control Panel Driver Loss (cont'd)

11.) In the GENERAL Tab for the hardware device select REINSTALL DRIVER.

12.) Select NEXT in the Driver Upgrade Wizard.

13.) Ensure that the *Search for a suitable driver for my device (recommended)* button is highlighted and then click on NEXT.

14.) From the Locate Driver Files window select *Specify a location*. Then click on NEXT.

15.) In the *Copy manufacturer's files from:* drop down box select ***C:\WINNT\System32\Drivers*** and select OK

16.) The Found Driver window will appear with the selected driver for the hardware device. Select NEXT to install the driver.

17.) Select FINISH from the last Driver Upgrade Wizard screen.

There should not be other problems but, if there are other hardware devices that need correcting, repeat step number 10 through 17.

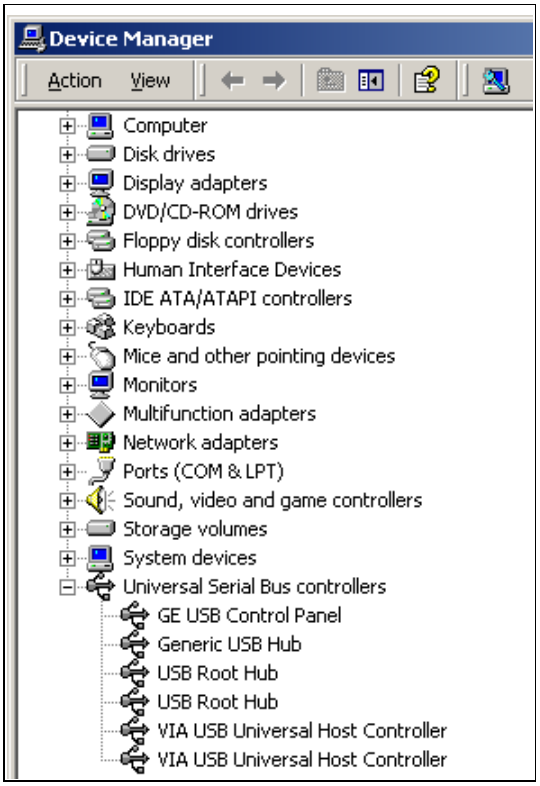


Figure 8-94 Good USB Drivers

NOTE: *Double check in the Device Manager the under USB Controllers to ensure that the GE USB Control Panel has no yellow question marks or exclamation marks in a yellow oval.*

18.) Close all windows and select the GO MUSASHI shortcut to start the echoloader application. The touch panel and GE control panel knobs, buttons and switches should now be fully functional.

8-16-6 If the System is NOT on a Network

If the system is connected to a network, skip this section.

If the system is **NOT** on a network, a static "dummy" IP-Address must be install in Windows for DICOM and Daignostics to function.

To install a Static IP-Address in windows:

1.) Boot up the system with the service dongle attached to the USB port.
2.) From the Start Applications dialog box, like the one shown in Figure 8-95, select MAINTENANCE Mode to enter the Windows desktop.
3.) The Maintenance Password screen will appear. Enter the current Service Password.
4.) Select Exit to Windows.

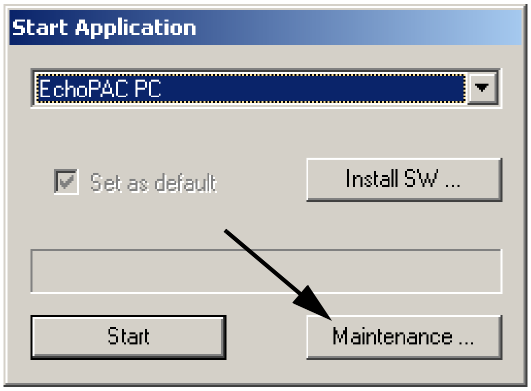
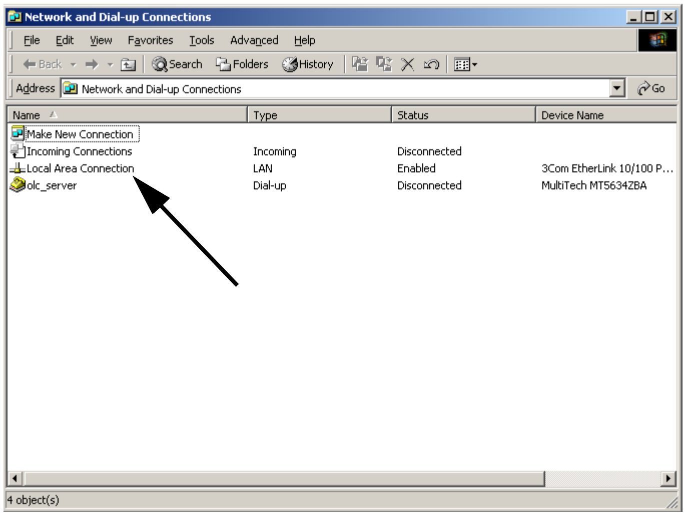


Figure 8-95 Select Maintenace Mode

5.) From the task bar at the bottom of the Touch Panel select START>SETTINGS>NETWORK DIALUP CONNECTIONS.
6.) From the window shown in Figure 8-96, double click on LOCAL AREA CONNECTIONS.



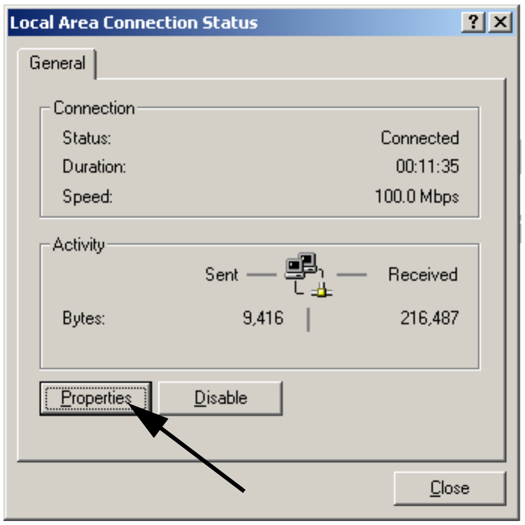
Address: Network and Dial-up Connections

Name	Type	Status	Device Name
Make New Connection			
Incoming Connections	Incoming	Disconnected	
Local Area Connection	LAN	Enabled	3Com EtherLink 10/100 P...
olc_server	Dial-up	Disconnected	MultiTech MT5634ZBA

4 object(s)

Figure 8-96 Network and Dialup Connections Window

7.) IF the local Area Connections Status Window is displayed, as shown in Figure 8-97, click on PROPERTIES.

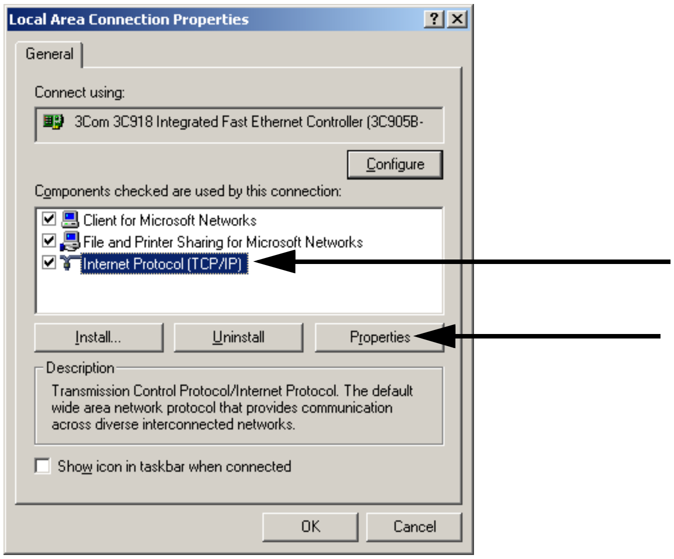


Status: Connected
Duration: 00:11:35
Speed: 100.0 Mbps

Sent — Received
Bytes: 9,416 | 216,487

Figure 8-97 Connection Status Window

8.) Hightlight INTERNET PROTOCOL (TCPIP) and select PROPERTIES as shown in Figure 8-98.



Connect using:
3Com 3C918 Integrated Fast Ethernet Controller (3C905B-

Components checked are used by this connection:
☑ Client for Microsoft Networks
☑ File and Printer Sharing for Microsoft Networks
☑ Internet Protocol (TCP/IP)

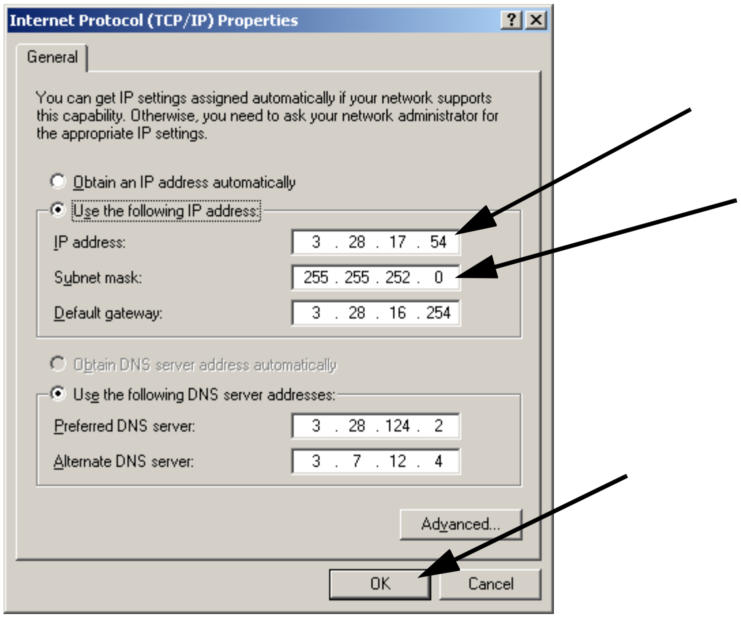
Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

☐ Show icon in taskbar when connected

Figure 8-98 TCPIP Properties Selection

9.) Select *Use this following IP address*. Fill in:

- IP-Address: 3.28.28.28
- Subnet Mask : 255.255.252.0



Internet Protocol (TCP/IP) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

○ Obtain an IP address automatically

● Use the following IP address:

IP address: 3 . 28 . 17 . 54

Subnet mask: 255 . 255 . 252 . 0

Default gateway: 3 . 28 . 16 . 254

○ Obtain DNS server address automatically

● Use the following DNS server addresses:

Preferred DNS server: 3 . 28 . 124 . 2

Alternate DNS server: 3 . 7 . 12 . 4

Figure 8-99 Static Network Settings in Windows

Section 8-17
AC Transformer Replacement Procedure

8-17-1 Manpower

1 person, 1 hour + travel.

8-17-2 Tools

Phillips screwdriver

8-17-3 Preparations (click here to view the cover removal video)

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3.

⚠ DANGER **Dangerous voltages are present in this equipment. Completely power off and shut down the scanner before servicing.**

2.) Remove the left- and/or right-side covers as shown in Section 8-2-2 on page 8-5.
3.) Remove the upper rear cover as shown in Section 8-2-3 on page 8-7.
4.) Remove the lower rear cover as shown in Section 8-2-6 on page 8-10.
5.) Remove five (5) plastic expansion plugs that holds Rat Guard. Use a small wire nipper or blade screwdriver.
6.) Turn and bend Rat Guard until it can be removed.
7.) Disconnect two cables from AC transformer.

8-17-4 AC Transformer Removal Procedure

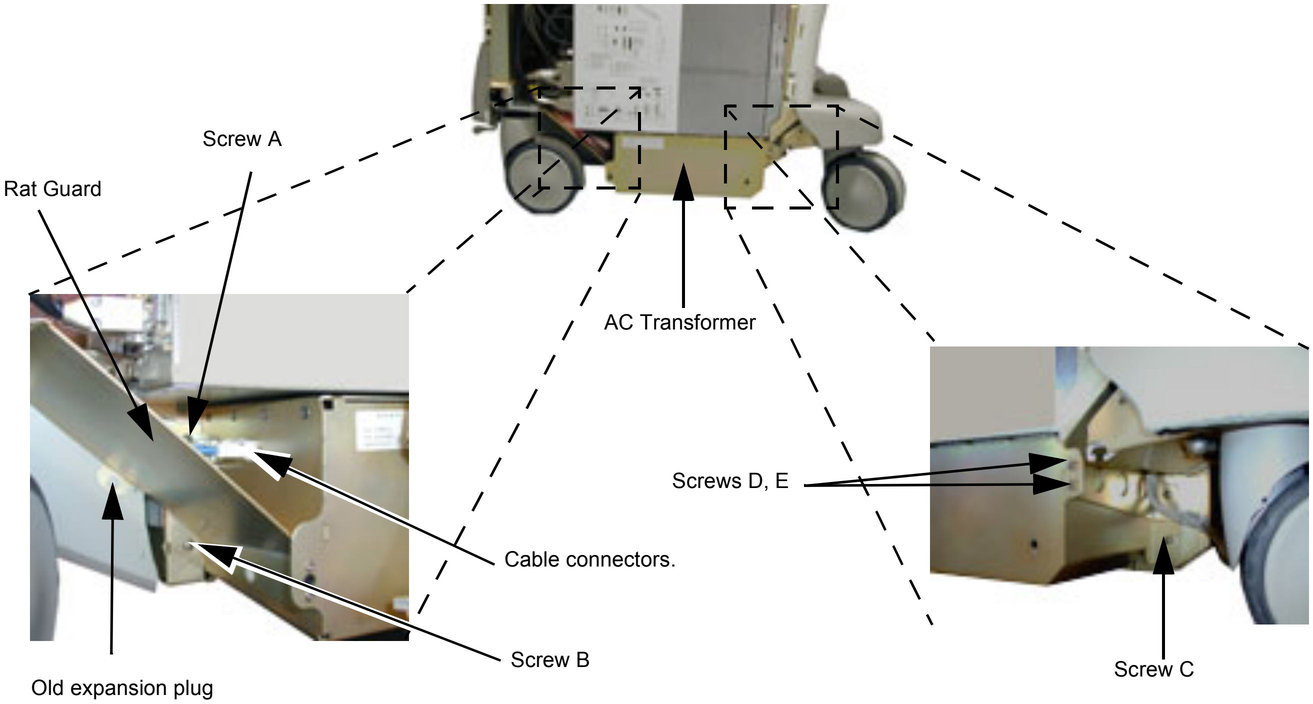


Figure 8-100 AC Transformer

1.) Loosen screw A, B and C (See Figure 8-100) a few turns. Unscrew screw D and E while you hold AC Transformer to prevent it from tilting forwards.
2.) Push AC Transformer to the left, tilt it forwards to free screw keyholes from screw heads (A,B and C) and lift the transformer off hooks along its the lower inner edge.

8-17-5 AC Transformer Installation Procedure

1.) Hang the inner lower edge of AC Transformer in its hooks.
2.) Adjust its position so that screw keyholes matches screw heads (A,B and C).
3.) Tilt AC Transformer upwards and push it to the right, screw heads into the keyholes.
4.) Hold it steady while you fasten screw D and E.
5.) Fasten screw A, B and C.
6.) Connect two cables.

8-17-5 AC Transformer Installation Procedure (cont'd)

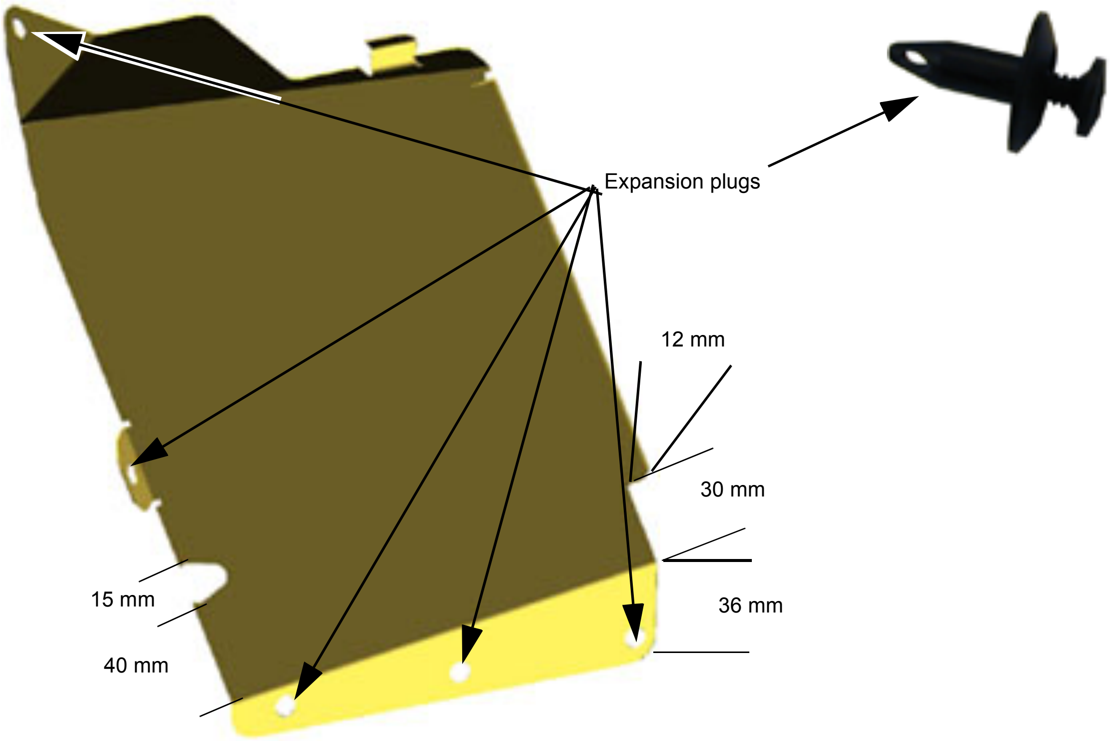


Figure 8-101 Rat Guard modification

7.) Compare Rat Guard with illustration in Figure 8-101 above. If it is not already done, use a hack saw or metal shears and modify Rat Guard according to this illustration.

8.) Install Rat Guard.

9.) Secure Rat Guard with five (5) new plastic expansion plugs, P/N 080X3141.

10.) Install the Lower Rear Cover as shown in Section 8-2-6 on page 8-10

11.) Install the Upper Rear Cover shown in Section 8-2-3 on page 8-7.

12.) Install both left- and right-side covers as shown in Section 8-2-2 on page 8-5.

13.) If required, Power On/Boot-up the scanner as described in Section 4-3-1 on page 4-2.

14.) Do functional check-out as described.

Section 8-18
Monitor Assembly Replacement Procedure

Select the movie camera icon to view the video of the monitor replacement procedure.

6 minutes and 13 seconds

8-18-1 Manpower

2 persons, 1 hour

8-18-2 Tools

#2 Phillips screwdriver

5 mm Hexagon key

8-18-3 Preparations (click here to view the cover removal video)

1.) Power Off/Shutdown the system as described in Section 4-3-2 on page 4-3.
2.) .Remove the Monitor cover: Refer to Figure 8-102 and Figure 8-103.
    a.) Remove the two top screw caps (covers)
    b.) Remove the top two screws.

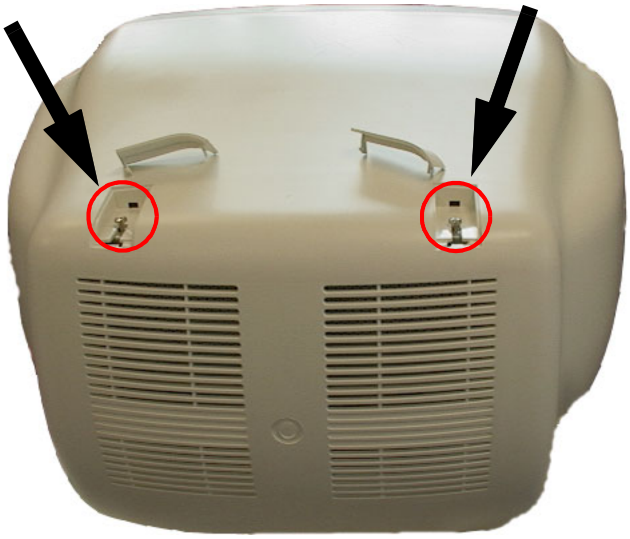


Figure 8-102 Monitor Cover Top Screws

    c.) Tilt the back of the monitor up as much as possible and position the back of the monitor over the top tray well.
    d.) Using a stubby screwdriver remove the two screws in the bottom of the cover.

8-18-3 Preparations (click here to view the cover removal video) (cont'd)

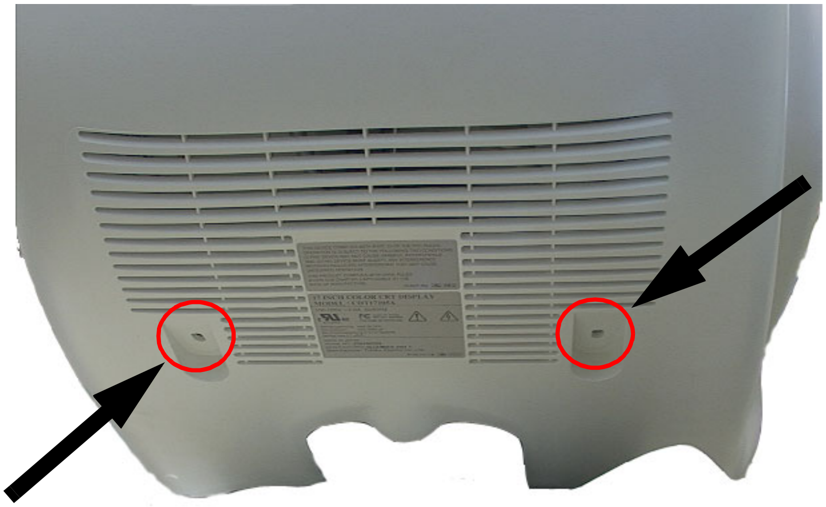


Figure 8-103 Bottom Cover Screws

e.) Slide the cover back and off of the monitor chassis. Ensure that both speaker grills are removed.

NOTE: The two speaker grills fit loosely and may come off with the cover or remain with the monitor chassis.

3.) Unplug the five (5) cables from the back of the monitor chassis. Remove the cables from any holders or tie downs.

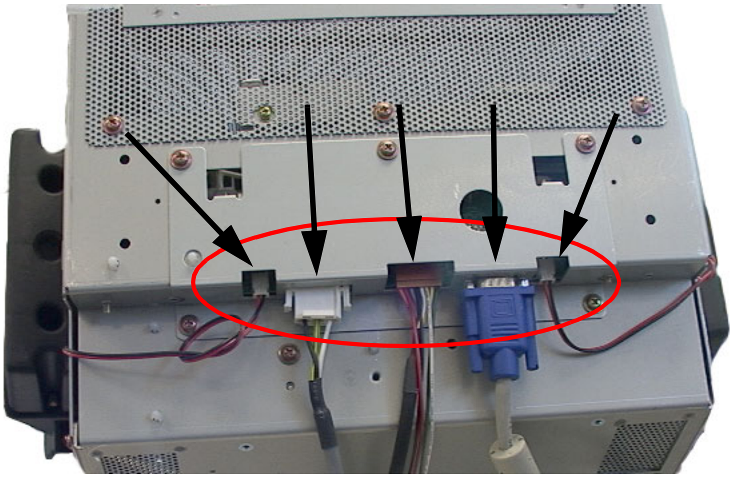


Figure 8-104 Cable Connections

4.) Remove the two loudspeakers by removing the two bottom mounting screws from the speaker assembly.

5.) Support the speaker assembly and remove the top mounting screws.

6.) Set the speakers aside.

8-18-3 Preparations (click here to view the cover removal video) (cont'd)

7.) Remove the monitor front bezel by removing the two screws from the left side and two screws from the right side.
8.) While supporting the bezel, disconnect the two cables to the brightness/contrast assembly.
9.) Set the bezel aside.

8-18-4 Monitor Removal

⚠ **CAUTION** **The monitor asembly weighs in excess of 22.7kg (50 lbs). Two people are required to safely remove and replace the monitor.**

1.) While one person supports the weight of the monitor, the second person removes the four hex head cap screws at the monitor mounting bracket.
2.) Both people carefully lift the monitor up off of the mounting bracket and set it aside for packing and return shipment.

8-18-5 Monitor Replacement

1.) Both people lift the new monitor from the packing crate or worksurface and set it on to the mounting bracket.
2.) While one person supports the front of the monitor, the second person first installs the back two hex screws and then the front two hex screws.
3.) Support the monitor front bezel while installing the two cables to the brightness/contrast assembly.
4.) Position the front bezel on the monitor and secure it with the two screws on the right side and two on the left side.
5.) Replace the right side speaker assembly by supporting it in position and securing it with two screws on the top and two on the bottom. The left speaker aseembly is secured with one screw on the top and two on the bottom.
6.) Reconnect the two speaker cables, video cable, power cable and control cable to the back of the monitor chassis. Refer to Figure 8-104.
7.) Fit the speaker grills to the monitor cover and slide the cover with the grills back on to the monitor assembly.
8.) Replace the two top screws on the cover but do not tighten them.
9.) Tilt the back of the monitor up and position it over the tray well to replace and tighten the two bottom screws.
10.) Tighten the two top cover screws and replace the screw caps.
11.) Power On/Boot-up the scanner as described in Section 4-3-1 on page 4-2.
12.) Do functional check-out as described.

Section 8-19
Loudspeaker Assembly Replacement

8-19-1 Man Power

1 person .5 hours plus travel

8-19-2 Tools

Phillips screwdriver

8-19-3 Preparations

1.) Power Off/Shutdown the system as described in Power Off / Shutdown on page 4-3.
2.) .Remove the Monitor cover: refer to Figure 8-105and Figure 8-106.
    a.) Remove the two top screw caps (covers)
    b.) Remove the top two screws.

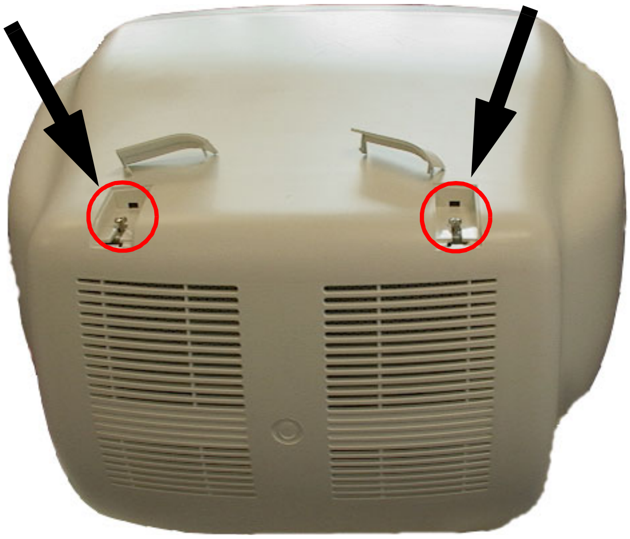


Figure 8-105 Monitor Cover Top Screws

    c.) Tilt the back of the monitor up as much as possible and position the back of the monitor over the top tray well.
    d.) Using a stubby screwdriver remove the two screws in the bottom of the cover.

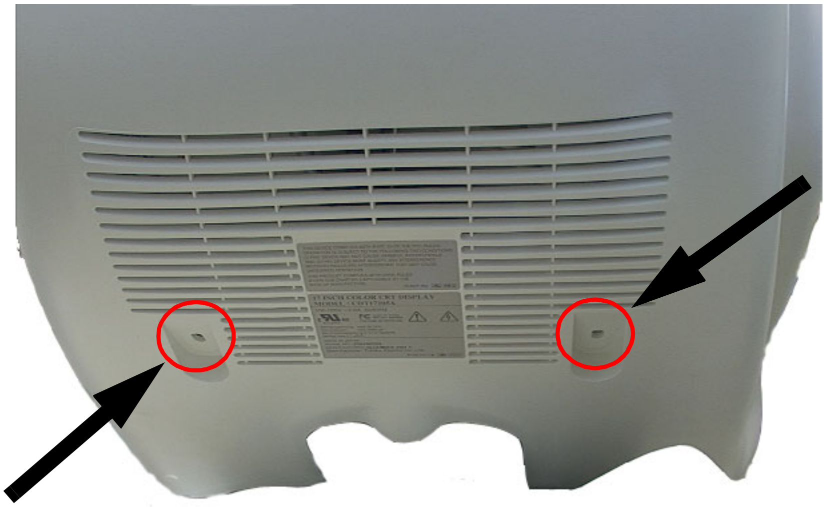


Figure 8-106 Bottom Cover Screws

e.) Slide the cover back and off of the monitor chassis.

NOTE: *The two speaker grills fit loosely and may come off with the cover or remain with the monitor chassis.*

8-19-4 Loudspeaker Removal Procedure

1.) Unplug the speaker cable from the back of the monitor chassis.

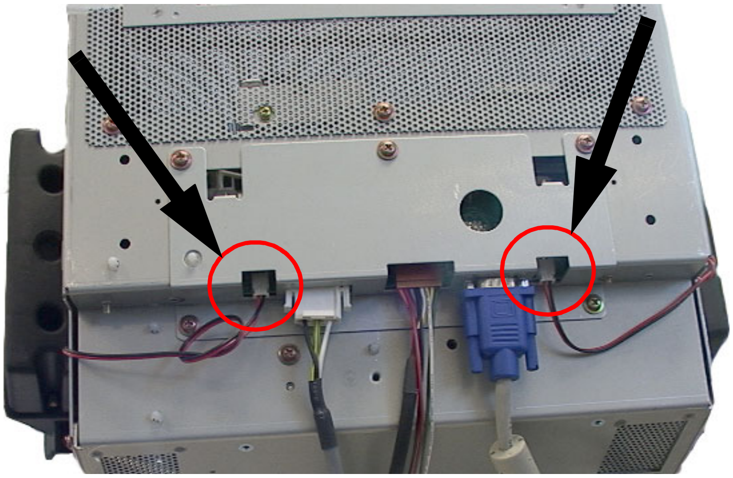


Figure 8-107 Speaker Connections

2.) Remove the two bottom mounting screws from the speaker assembly.

3.) Support the speaker assembly and remove the two top mounting screws.

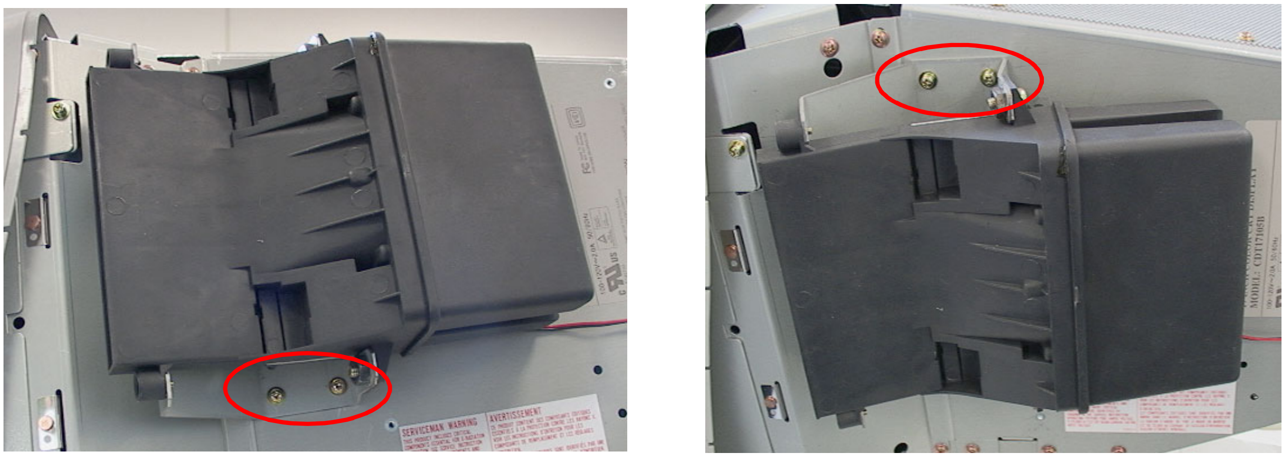


Figure 8-108 Speaker Mounting Screws

8-19-5 Loudspeaker Installation Procedure

1.) Mount the new speaker assembly by loosely fastening the two top mounting screws and then the two bottom mounting screws.
2.) Position the speaker assembly and tighten all four screws.
3.) Plug the speaker cable into the back of the monitor chassis.
4.) Replace the cover with speaker grills.
5.) Replace the two top screws on the cover but do not tighten them.
6.) Tilt the back of the monitor up and position it over the tray well to replace and tighten the two bottom screws.
7.) Tighten the two top cover screws and replace the screw caps.
8.) Power On/Boot-up the scanner as described in Section 4-3-1 on page 4-2.
9.) Do functional check-out as described.

Section 8-20
Monitor Shelf Replacement Procedure

8-20-1 Manpower

2 persons, 1 hour

8-20-2 Tools

10 or 12 MM wrenches

Allen/Unbraco wrenches

8-20-3 Preparations

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3.

8-20-4 Removal Procedure

1.) Raise the operator panel to its highest position.
2.) Release the X-Y lock and pull the operator panel out as far as it goes.
3.) Remove any screws from the following locations. On some systems, screws may not be in all locations.

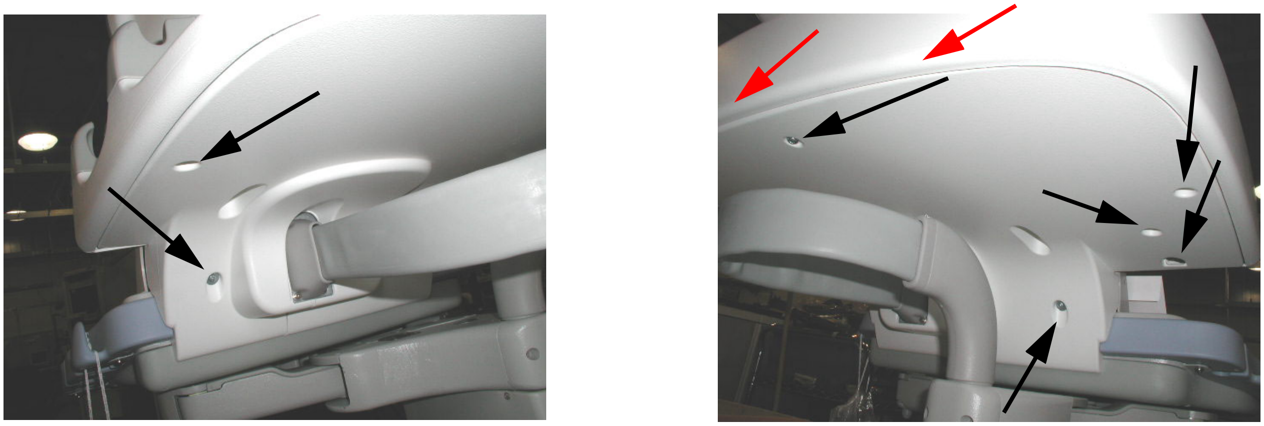


Figure 8-109 Right and Left Side Screw Locations

4.) “Pop” the Undershelf Cover from out of the Shelf Cover, running a screwdriver between the covers may help here.
5.) Slide the undershelf along the main cable to get it out of the way.
6.) Remove the Monitor as described in Section Section 8-18 on page 8-92.

8-20-4 Removal Procedure (cont'd)

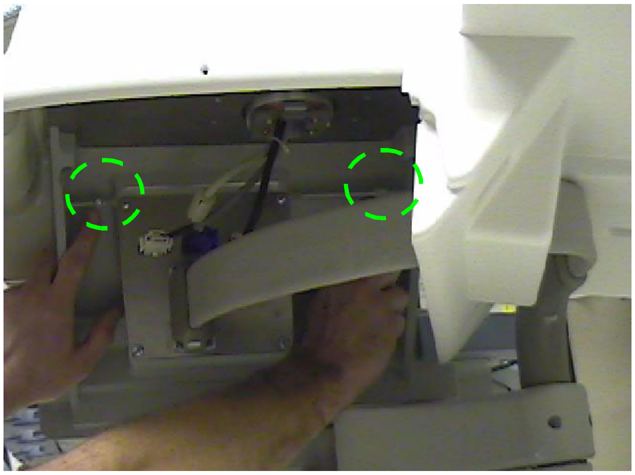


Figure 8-110 Touch Panel Screws (2)

7.) Remove the two screws holding the Touch Panel (Figure 8-110). Lean the Touch Panel forward.
8.) Remove the two screws along the top/front and the two screws from the pocket tray.
9.) From underneath, remove any remaining screws from brackets attaching the Monitor Shelf Cover.
10.) Remove the cover, then remove the TV/TR Probe Holders and Gel Warmer from the Monitor Shelf Cover.

8-20-5 Mounting Procedure

1.) Replace the TV/TR Probe Holders and Gel Warmer from the Monitor Shelf Cover.
2.) Position the Cover on the system.
3.) From the underside, replace the screws through brackets attaching the Monitor Shelf Cover.
4.) Replace the two screws along the top/front and the two screws from the pocket tray.
5.) Reposition the Touch Panel over the monitor cover. Replace the two screws holding the Touch Panel (Figure 8-110).
6.) Replace the Monitor Assembly.
7.) Reposition the Under Shelf Cover and secure with the screws previously removed.

Section 8-21
Z-Release Handle Replacement

8-21-1 Manpower

One person, 30 minutes

8-21-2 Tools

Hexagon key 3 mm

8-21-3 Z-Release Handle Removal Procedure

1.) Unscrew 1 hexagon screw.
2.) Release the wire-end lock from the handle.
3.) Remove the handle.

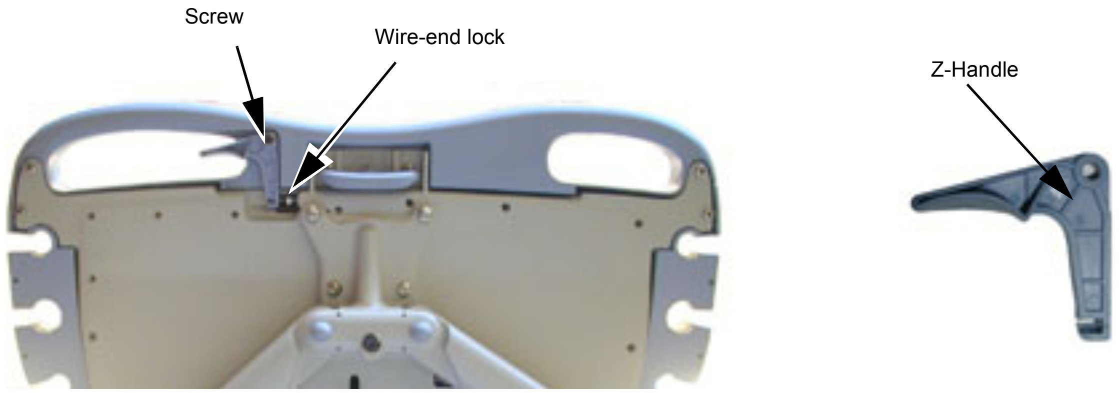


Figure 8-111 Z-release handle

8-21-4 Z-Release Handle Installation Procedure

1.) Install wire-end lock in the handle.
2.) Install handle.
3.) Fasten hexagon screw.

Section 8-22
X/Y Release Handle Replacement

8-22-1 Manpower

One person, 30 minutes

8-22-2 Tools

Hexagon key 3 mm

Phillips screwdriver size 3

Socket 8 mm

8-22-3 XY-Release Handle Removal Procedure

1.) Unscrew 1 hexagon screw and release Z-handle.
2.) Unscrew 4 Phillips screws and remove Front Handle.
3.) Unscrew 1 nut and remove XY-handle.

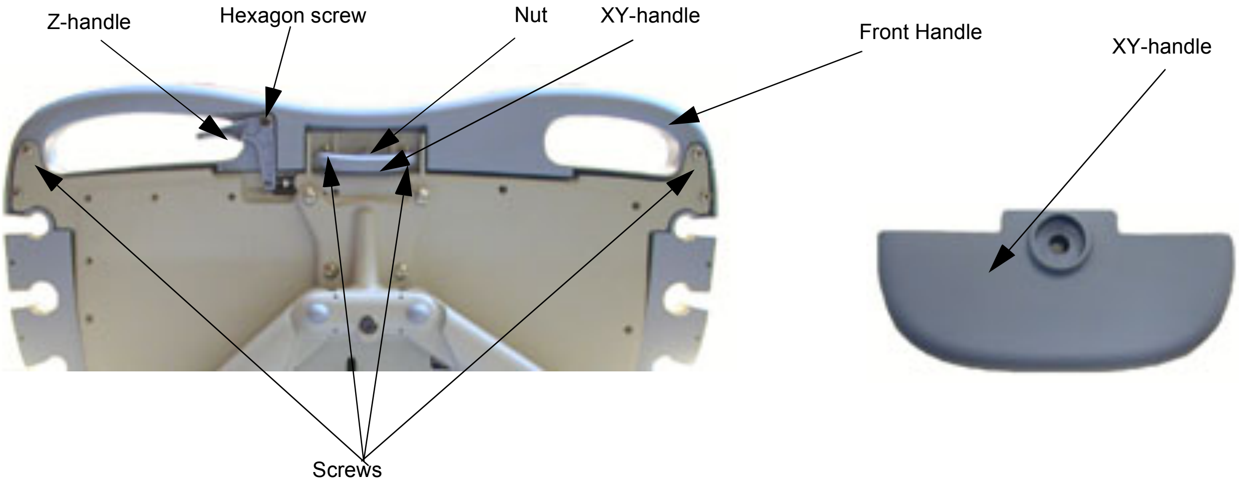


Figure 8-112 XY-release handle

8-22-4 XY-Release Handle Installation Procedure

1.) Install a new handle.
2.) Fasten the nut.
3.) Install Front handle.
4.) Install Z-handle.

Section 8-23
Console Lock Assembly Replacement Procedure

8-23-1 Manpower

One person, 1 hour

8-23-2 Tools

Hexagon key 2,5 and 3 mm

Phillips screwdriver size 2

Socket 8 mm

8-23-3 Preparations

1.) Shut down the system as described in Power Off / Shutdown on page 4-3.
2.) Remove Operator Panel.
3.) Remove XY- Handle as described in X/Y Release Handle Replacement on page 8-101.

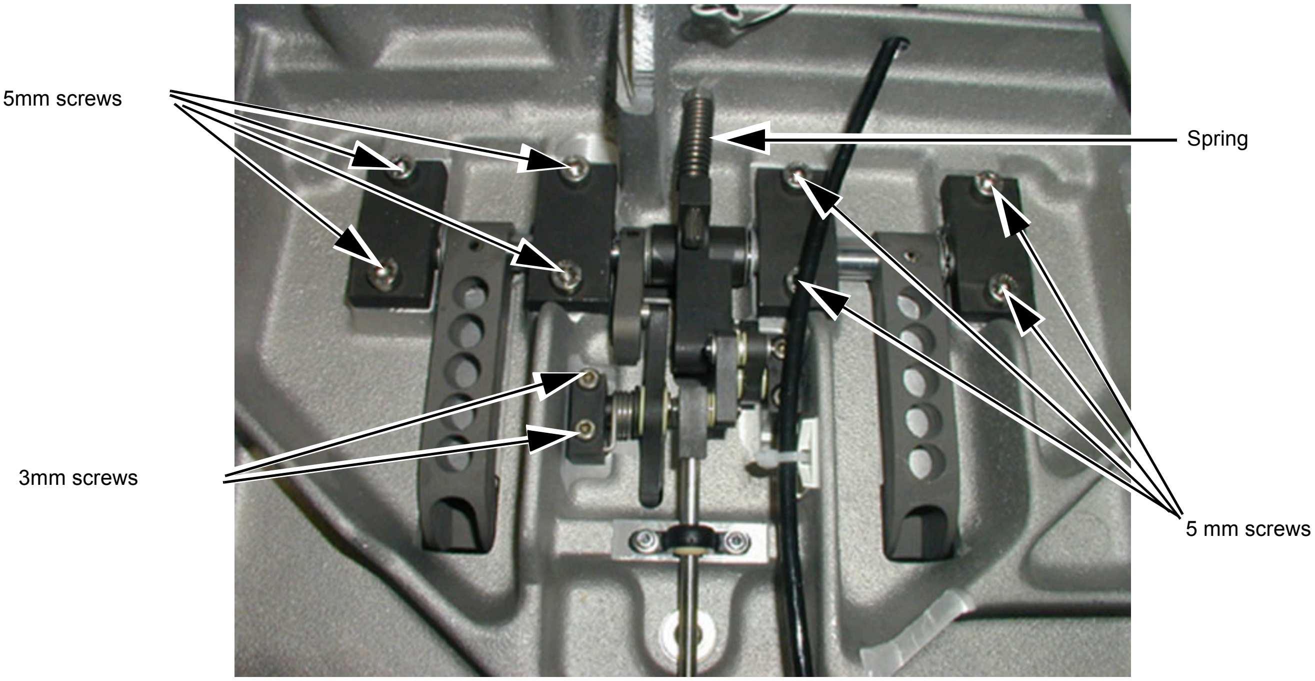


Figure 8-113 Console Lock Assembly

8-23-4 Console Lock Assembly Removal Procedure

1.) Unscrew 8 (5 mm) and 2 (3 mm) hexagon screws (See Figure 8-113).
2.) Take care of the spring.
3.) Remove the Console Lock Assembly.

8-23-5 Console Lock Assembly Installation Procedure

1.) Install the Lock Assembly.
2.) Install the spring.
3.) Fasten the 10 hexagon screws.
4.) Install Operator Panel.

Section 8-24
Release Lock Assembly Replacement Procedure

8-24-1 Manpower

One person, 1 hour

8-24-2 Tools

- Hexagon key 2,5 and 3 mm
- Phillips screwdriver size 2
- Socket 8 mm

8-24-3 Preparations

1.) Shut down the system as described in Power Off / Shutdown on page 4-3.
2.) Remove Operator Panel as described in Operator Panel Removal Procedure on page 8-112.
3.) Remove XY- Handle as described in XY-Release Handle Removal Procedure on page 8-101.

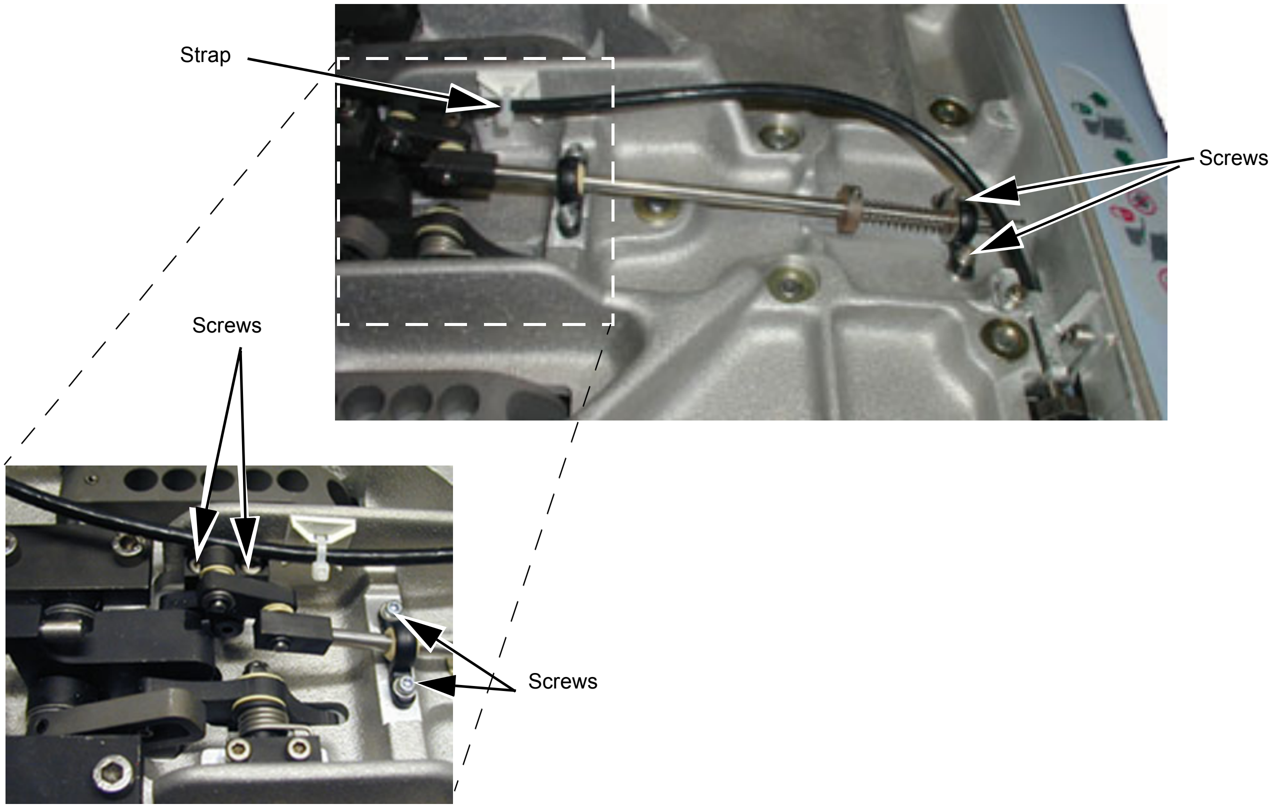


Figure 8-114   Release Lock Assembly

8-24-4 Release Lock Removal Procedure

1.) Unscrew 8 mm nut behind XY-Handle.
2.) Unscrew 2 hexagon screws (3 mm).
3.) Unscrew 4 hexagon screws (2,5 mm).
4.) Remove Release Lock Assembly.

8-24-5 Release Lock Installation Procedure

1.) Install Release Lock Assembly.
2.) Fasten 6 hexagon screws.
3.) Fasten nut behind XY- Handle.
4.) Install XY-Handle as described in XY-Release Handle Installation Procedure on page 8-101.
5.) Install Operator Panel as described in Operator Panel Installation Procedure on page 8-112.

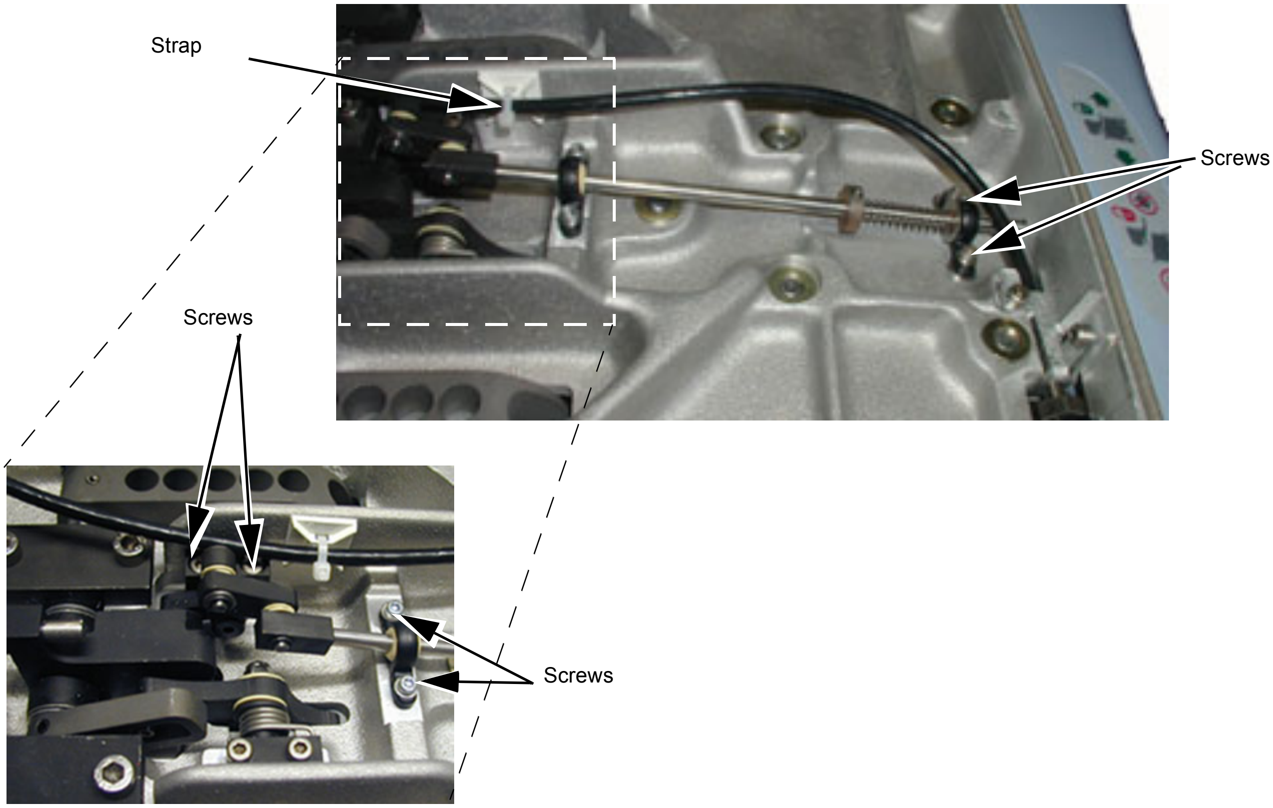


Figure 8-115 Release Lock Assembly

Section 8-25
AC Controller Replacement Procedure

8-25-1 Manpower

1 person, 1 hours

8-25-2 Tools

Phillips screw driver No. 2

⚠ **DANGER** **Dangerous voltages are present in this equipment. Completely power off and shut down the scanner before servicing.**

8-25-3 Preparations (click here to view the cover removal video)

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3.

2.) Remove the Right and Left Covers as described on Section 8-2-2 on page 8-5.

3.) Remove the Upper Rear Cover as described in Section 8-2-3 on page 8-7 and the Lower Rear Cover as described in Section 8-2-6 on page 8-10.

NOTE: *Identify the Part Number and Voltage type of AC power being replaced*

8-25-4 AC Controller Removal Procedure

1.) Disconnect Speed Control cable, Fan cable and Input Voltage cable.

2.) Remove four (4) screws holding AC Power.

3.) Turn AC Power Module to get better access and unplug the rest of the cables. Make sure each connector and socket are properly marked, and easy to identify during installation.

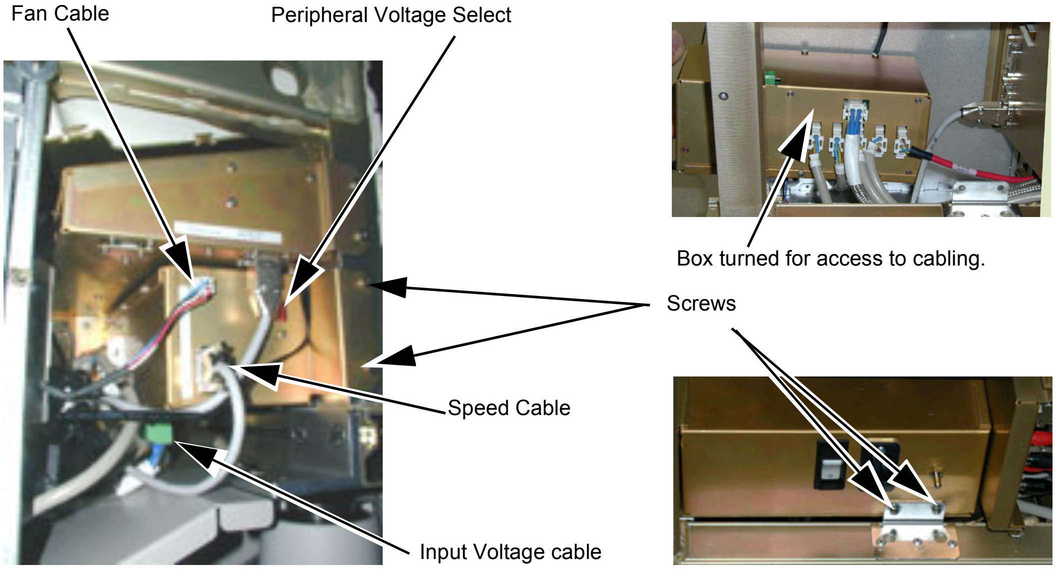


Figure 8-116 AC Power Module

8-25-5 AC Controller Installation Procedure

DANGER **Before installing a replacement unit, verify that the power selector on the AC Power Module is set to the correct voltage for the peripherals used on the system.**

1.) Connect the cables. You may need to leave the Speed Control cable and the Fan cable unconnected until you have fastened the unit. Input Voltage connector and socket are coded to prevent mistakes. In 115V system the connector matches one end of the 8-holed socket. In 230V system it matches the other end of the socket. Figure 8-117 is on a 230V system, and the connector can only be plugged in the right end of the socket.

2.) Fasten AC Power Module for correct Voltage and connect the remaining cables.

3.) Mount the Rear Covers as described in Section 8-2-3 on page 8-7 and in Section 8-2-6 on page 8-10.

4.) Mount Side Covers as described in Section 8-2-2 on page 8-5.

5.) Do functional check-out.

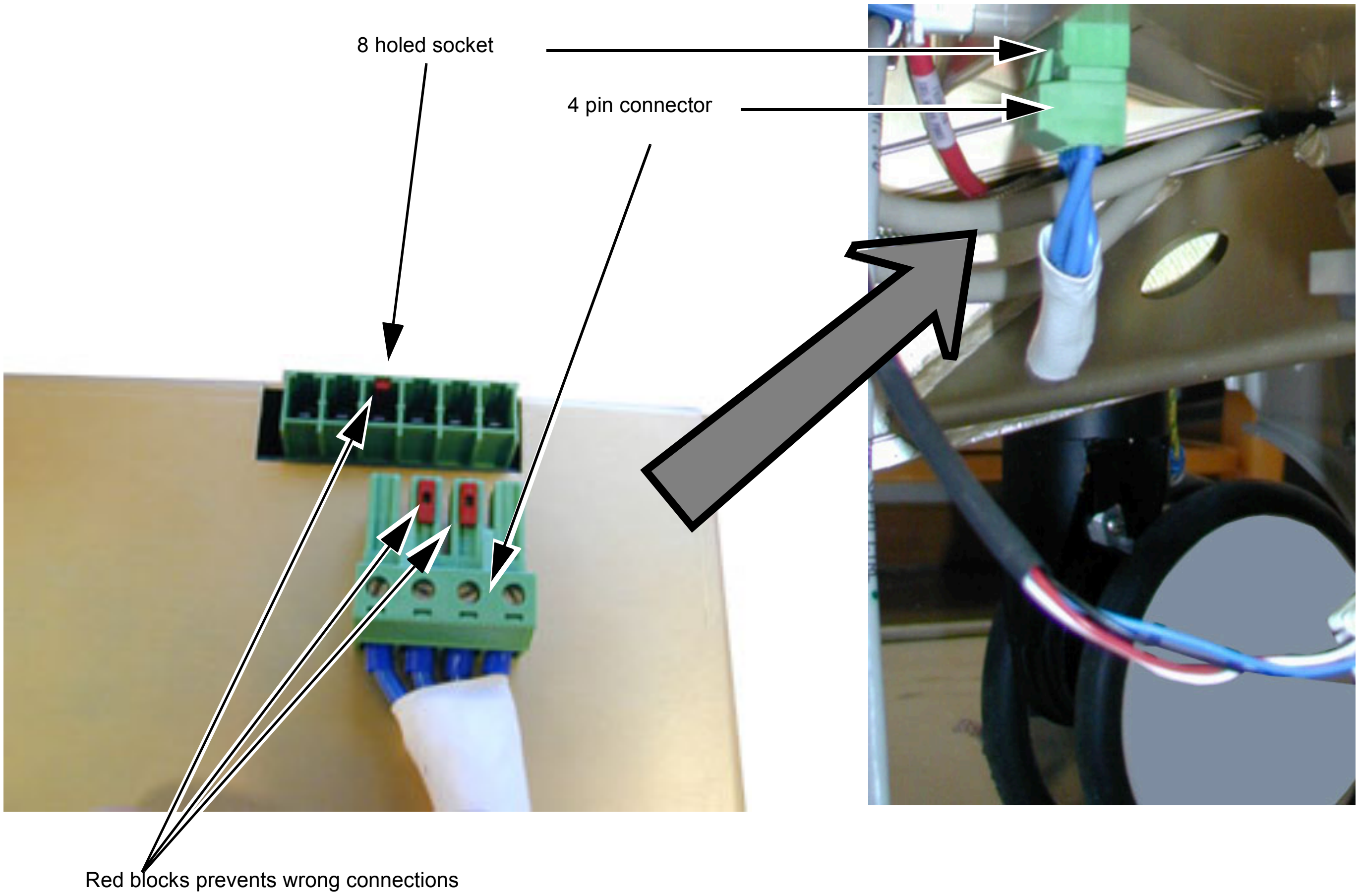


Figure 8-117 Input Voltage connector/socket

Section 8-26
Upper Operator Panel Replacement Procedure

8-26-1 Manpower

One person, 1 hour

8-26-2 Tools

Phillips screwdriver

8-26-3 Preparations

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3

8-26-4 Upper Operator Panel Removal Procedure

1.) Remove the two Philips screws at the rear of the unit that secure the Under Shelf Cover to the Shelf Cover Assembly.

2.) Remove the two Phillips screws underneath the Under Shelf Cover that secure the Under Shelf Cover to the frame behind the Upper Operator panel.

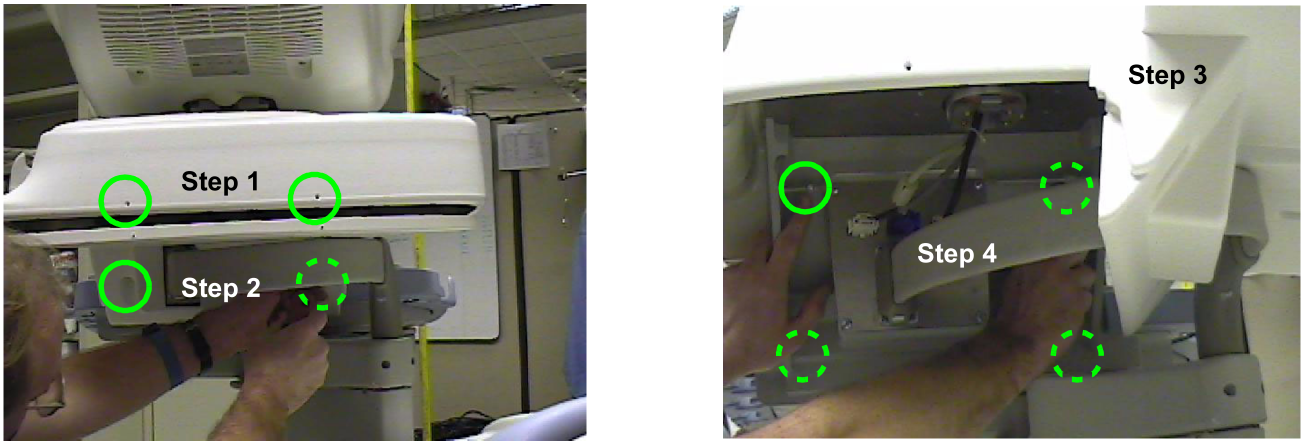


Figure 8-118 Steps 1 through 4

3.) Slide the Under Shelf Cover out of the way to gain access to the screws that secure the Upper Operator panel to the ultrasound frame.

4.) Remove the screws securing the Upper Operator panel to the ultrasound frame. (Your model should only have the top two screws, however it may have four)

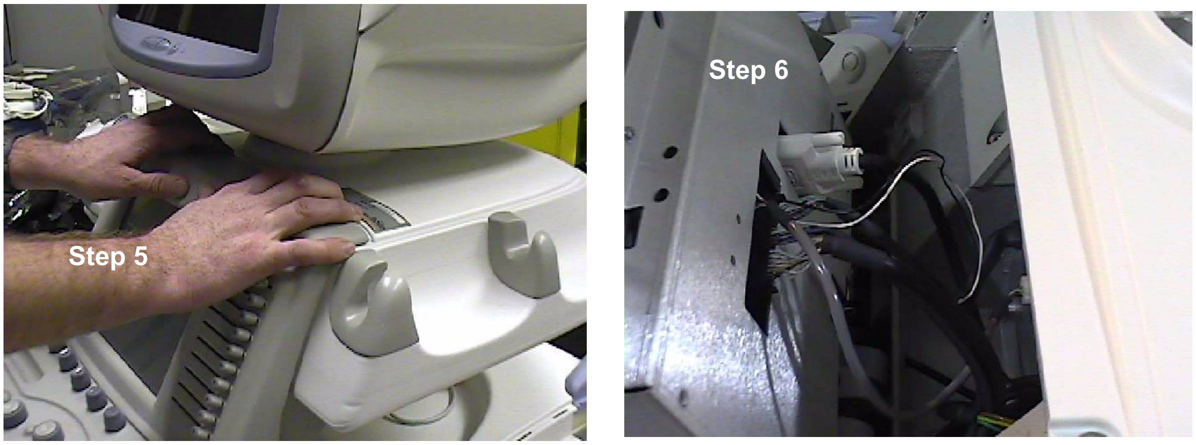


Figure 8-119

5.) Disconnect the Video Cable from the Upper Operator Panel.

6.) Mark and disconnect the remaining wires to remove the Upper Operator Panel from the scanner. The wires consist of:

   a.) Video Cable
   b.) Bundle
   c.) Five ribbon cables (A-E)
   d.) Two small wires

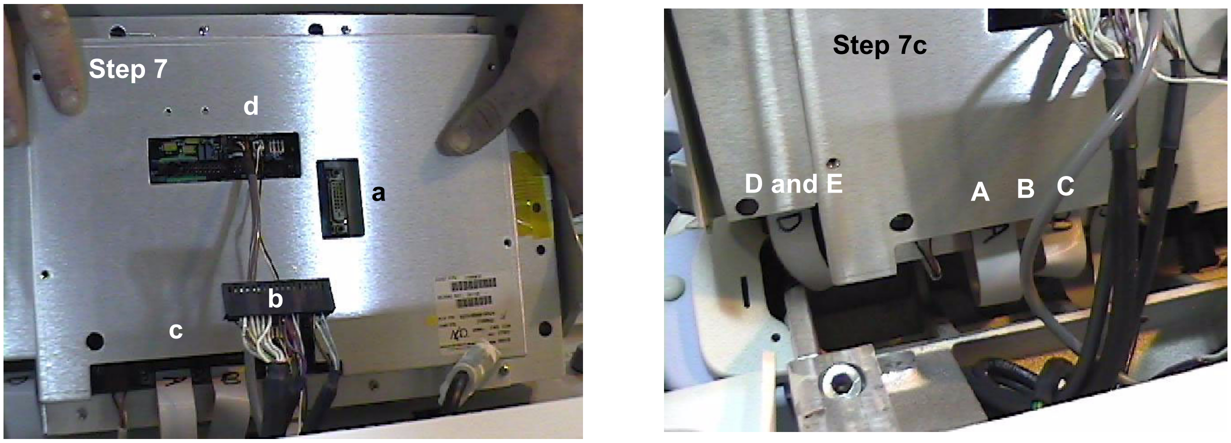


Figure 8-120 Steps 7 and 7c

8-26-5 Upper Operator Panel Installation Procedure

1.) Install the new Upper Operator Panel.
2.) Connect the 5 ribbon cables (A-E).
3.) Connect the small wire and wire bundle to the back of the Upper Operator Panel.
4.) Attach the Video Cable to the back of the Upper Operator Panel.
5.) Secure the wires from the Upper Operator Panel into the cut-out area behind the Upper Operator Panel.
6.) Install the two (perhaps 4) screws that secure the Upper Operator Panel to the ultrasound frame.
7.) Slide the Under Shelf Cover back into place and secure in place with the Phillips screws
8.) Secure the Under Shelf Cover to the Shelf Cover Assembly with the two Phillips screws.

Section 8-27
Lower Operator Panel Replacement Procedure

8-27-1 Manpower

One person, 2 hours

8-27-2 Tools

Phillips screwdriver size 2

8-27-3 Preparations

1.) Shut down the system as described in Power Off / Shutdown on page 4-3.

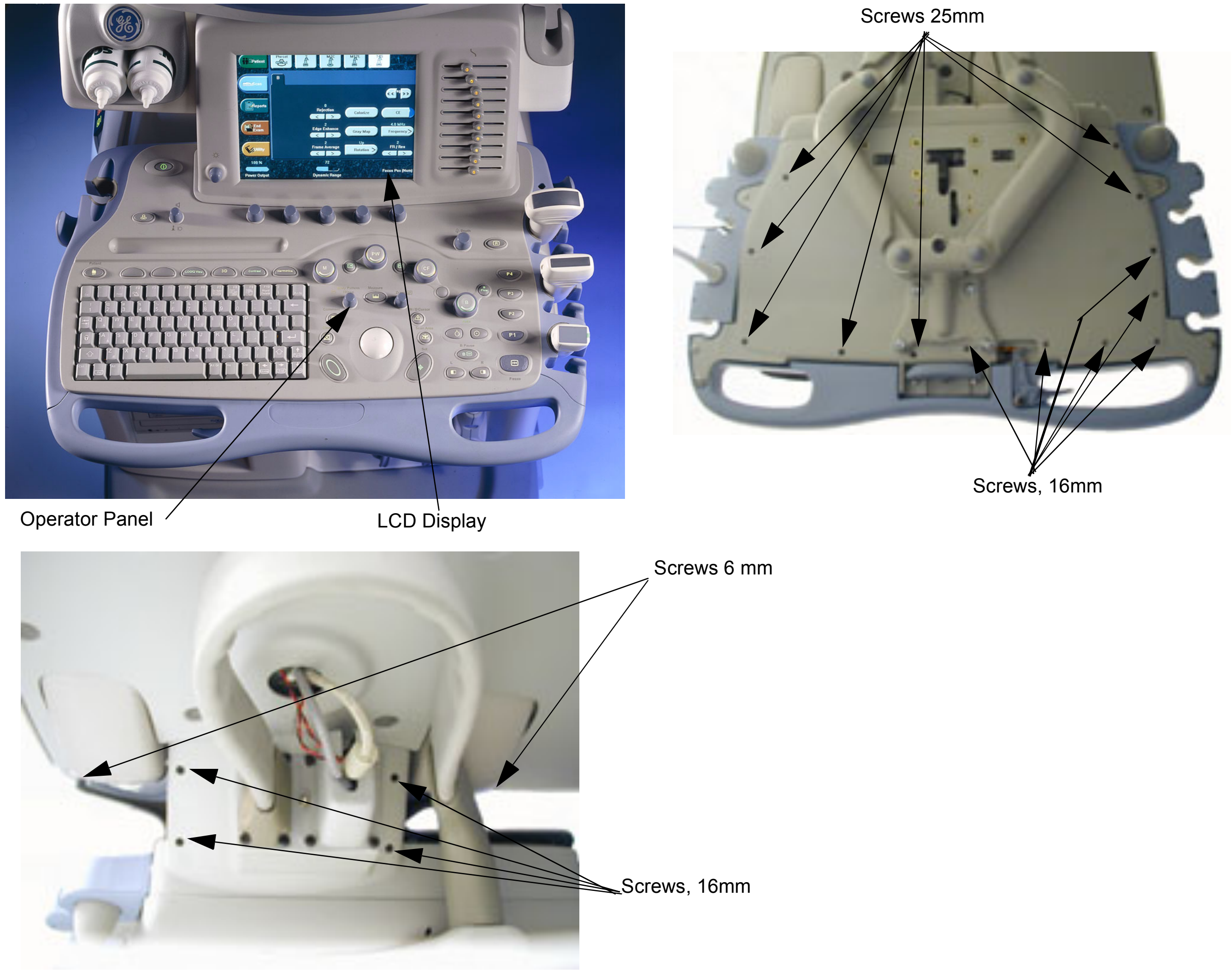


Figure 8-121 Operator Panel

8-27-4 Operator Panel Removal Procedure

1.) Unscrew 13 screws under the Top Console and 4 behind LCD Display.

NOTE: 10 screws are 16 mm long and 7 are 25 mm.

2.) Unscrew 2 screws (6 mm) behind the Front Panel, located beside speakers on the shelf undercover.
3.) Lift Operator Panel carefully in front first. Disconnect 3 connectors.
4.) Remove Operator Panel.

8-27-5 Operator Panel Installation Procedure

1.) Put the Operator Panel carefully on Top Console.
2.) Connect 3 connectors.
3.) Install the panel in correct position.
4.) Fasten 13 screws under the Top Console and 6 behind LCD Display.

Section 8-28
Keypad Replacement Procedure

8-28-1 Manpower

One person,

8-28-2 Tools

Fingernail or a small screwdriver blade

8-28-3 Preparations

This procedure describes how worn out keypads or keypads of one language can be replaced with new keypads or keypads of other language.

Shut down the system as described in Power Off / Shutdown on page 4-3.

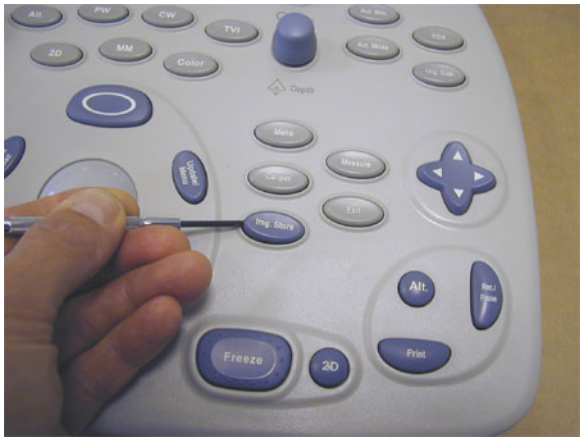


Figure 8-122 Flip off keypad

8-28-4 Keypad Replacement Procedure

1.) Flip off keypads with your fingernail or a small screwdriver blade.
2.) Install replacement pads.

Section 8-29
Alpha-Numeric (A/N) Keyboard Replacement Procedure

The A/N Keyboard can be replaced without removal of the operator panel from the frame. The screws for removal are hidden under the “return” and left “shift” keys.

8-29-1 Manpower

8-29-2 Tools

A key removal tool is required. Acquire a commerical key removal tool or fashion two loops made from paperclips as shown in Figure 8-123 on page 8-114 .

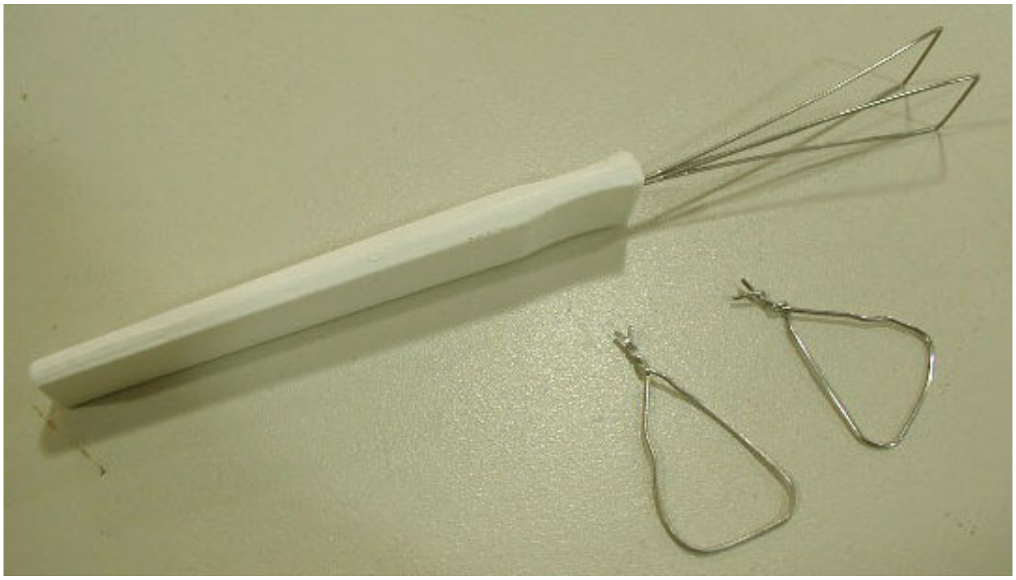


Figure 8-123 Key Removal Tools

8-29-3 Preparations

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3

8-29-4 A/N Keyboard Removal

1.) Place the loops under opposite corners of the key to be removed as shown in Figure 8-124 on page 8-115 . To remove the AN keyboard, the “return” and left “shift” keys must be removed.

2.) Pull up with the tool but also slightly to the top edge (number row) of the keyboard. The slight pull towards the top forces the white plunger to come off with the key. If using paperclips, it works best if you use one hand on each clip and pull together.

3.) If the white plunger stays in the keyboard, you can reinstall the key and try again. Or, the plunger can be removed from the keyboard needle nose pliers grabbing between the same points as where the key inserts.

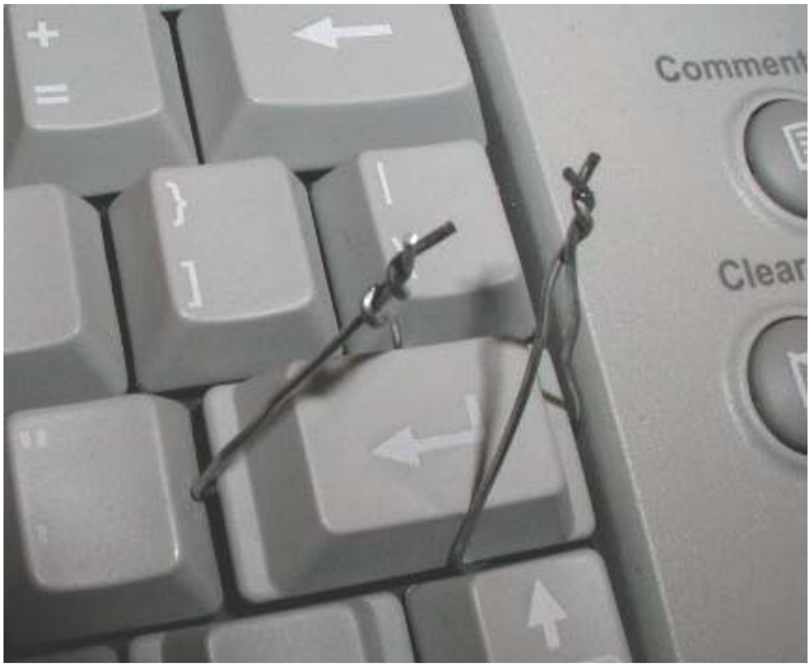


Figure 8-124 Removal Tool in Place

4.) After the key is removed, push the plunger into the keytop to make sure it is seated all the way.

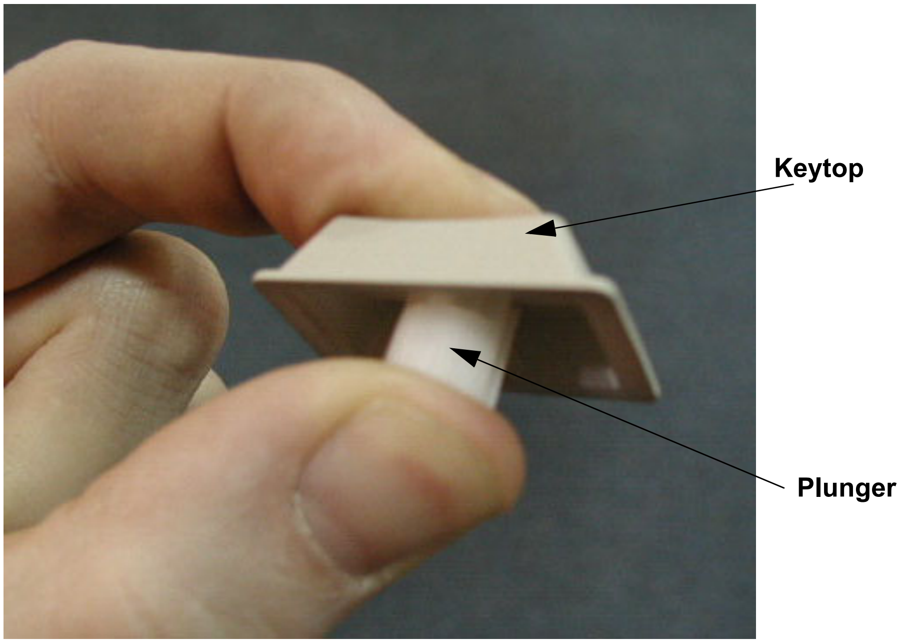


Figure 8-125 Keytop and Plunger Assembly

8-29-4 A/N Keyboard Removal (cont'd)

5.) With the “return” and left “shift” keys are removed, you can see the screws that secure the keyboard to the plastic bezel. Loosen these screws so that they pop up but do not remove them as they are captive screws that remain with the AN keyboard.

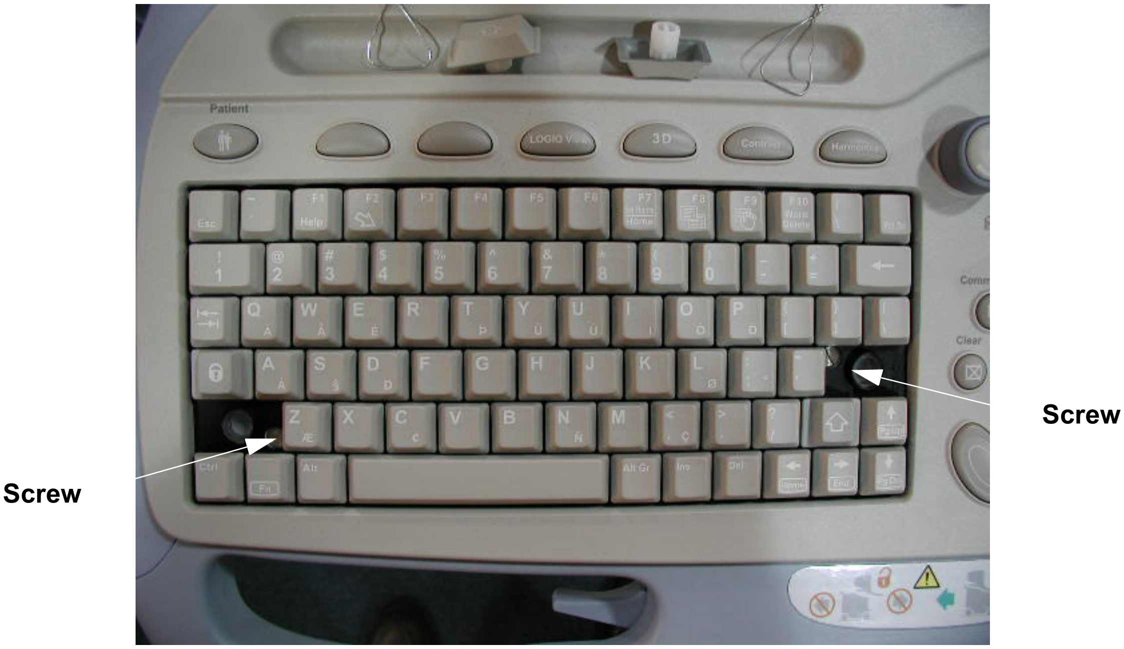


Figure 8-126 Keyboard Screw Locations

6.) Using the key removal tool, lift up on a key to help pull the AN keyboard out of the plastic bezel. Choose a key to the far right and lift the right side of the keyboard out first.

7.) Lift out the bottom edge of the keyboard bar to gain access to the interconnect cables. Detach the 2 cables from the keyboard and lift the keyboard out.

8-29-4 A/N Keyboard Removal (cont'd)

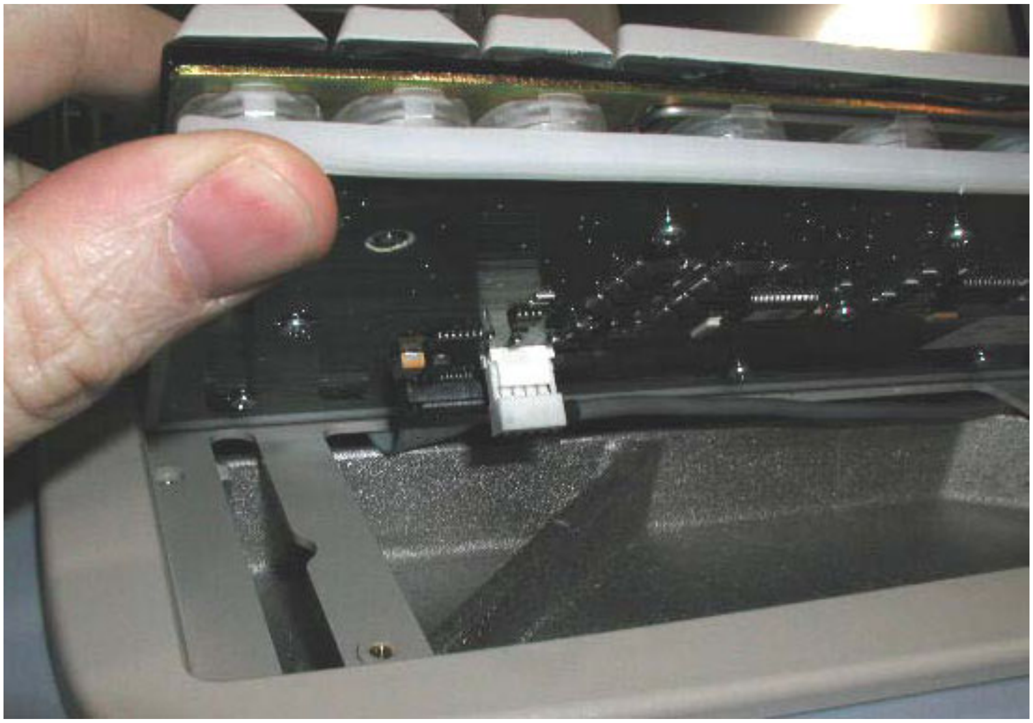


Figure 8-127 Interconnect Cable Locations

8.) Install the removed keys back onto the removed keyboard. If a key does not seem to seat down fully, it is probably because the plunger is not pressed onto the keytop all the way.

8-29-5 A/N Keyboard Installation

1.) Using the key removal tool, remove the “return” and left “shift” keys from the replacement keyboard. use the same procedure as before. Make sure that the plungers come off with the keys and that they are fully seated into the keytop after removal.

2.) Check the replacement keyboards rubber gasket. When seated correctly, it should wrap around the edge of the circuit board. If the gasket is not seated correctly, the keyboard will be difficult to install.

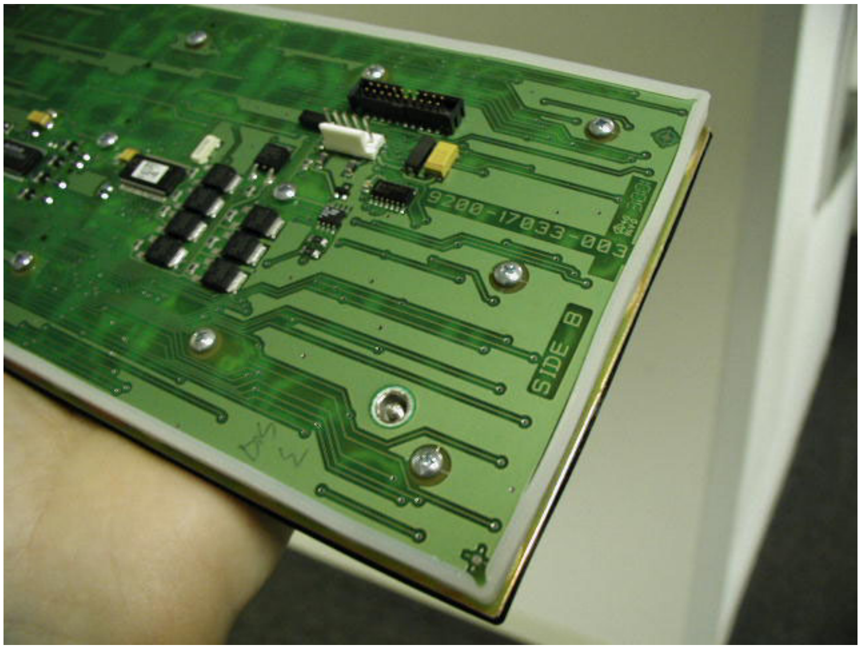


Figure 8-128 Keyboard Gasket

3.) Connect the cables to the replacement keyboard. Check that the cables are not shifted by one row of pins as this is possible to do.

4.) Insert the keyboard left side first making sure the gasket remains seated around the circuit board.

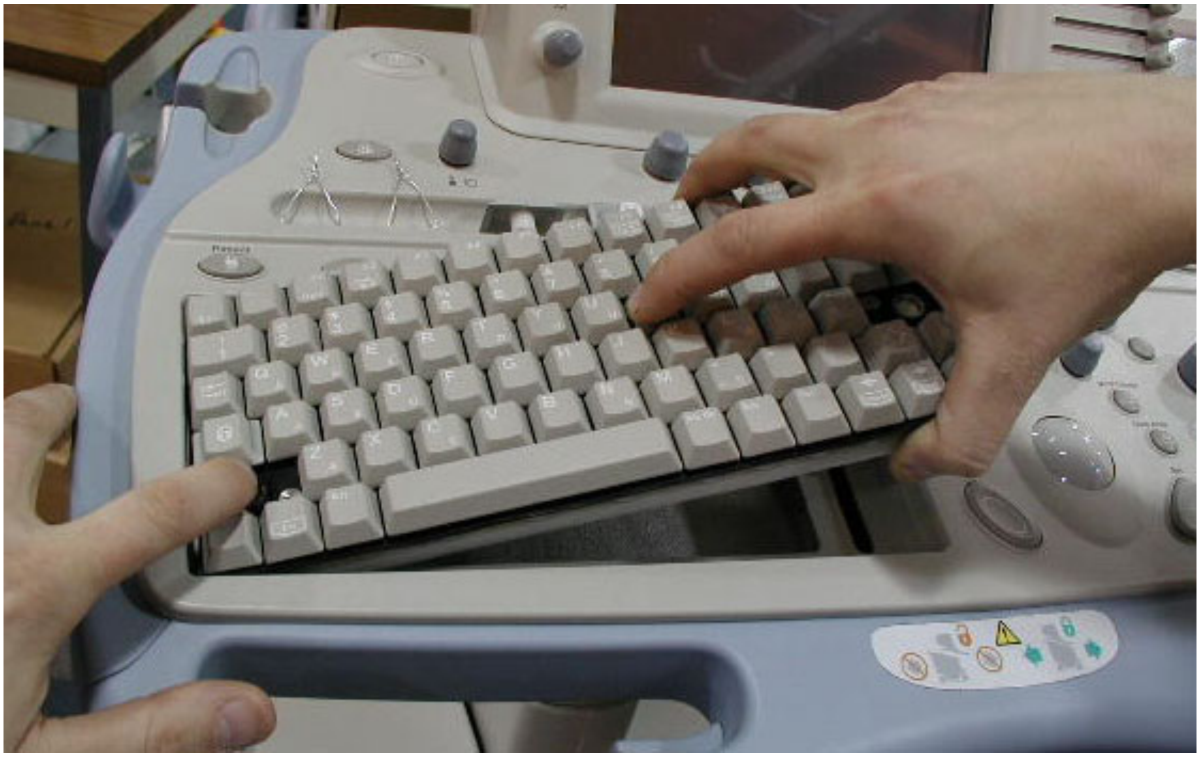


Figure 8-129 Replacing Keyboard

5.) Continue to work the keyboard down into the plastics slightly pushing to the left so that the gasket on the right side goes into the plastics without getting disturbed.
6.) Seat the keyboard fully by pushing down on the whole keyboard with both hands.
7.) Check the function of the keys around the keyboard edge. If keys stick or have a bad feel. the gasket probably got disturbed and is not around the edge of the circuit board. Remove the keyboard check the gasket and try again.
8.) If the keyboard is seated correctly, secure it with the screws.
9.) Reinstall the keytops. If a keytop seem too high, the white plunger was probably not seated all the way into the keytop. The keytop and plunger must be removed to fully seat the plunger into the keytop.
10.) Energize the system and type with the keyboard to check the function of each key.

Section 8-30
Trackball Assembly Replacement Procedure

8-30-1 Manpower

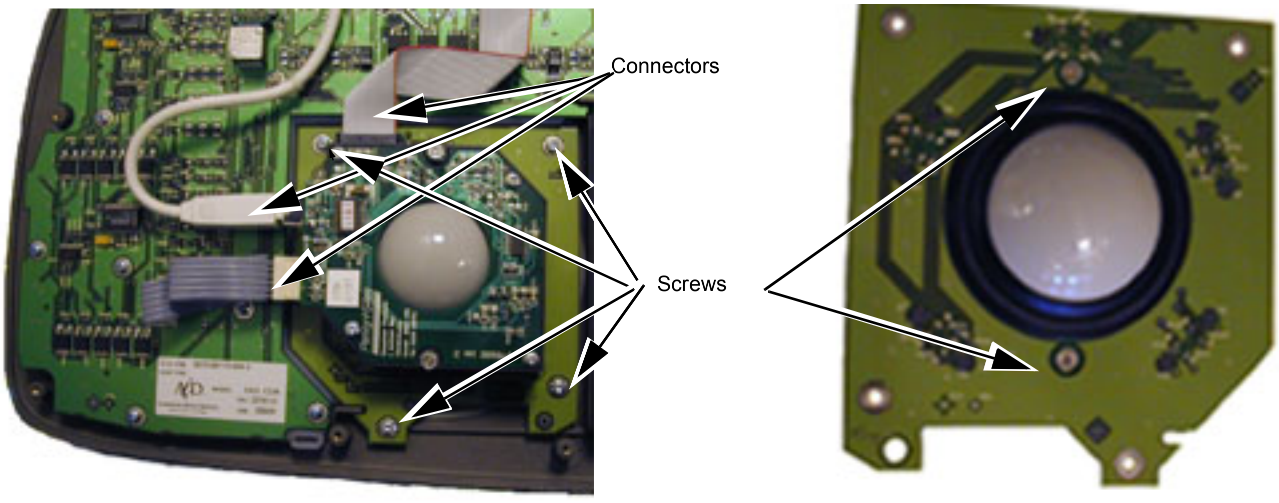
One person, 1 hour 30 minutes

8-30-2 Tools

- Phillips screwdriver size 1
- Socket 2,5 mm

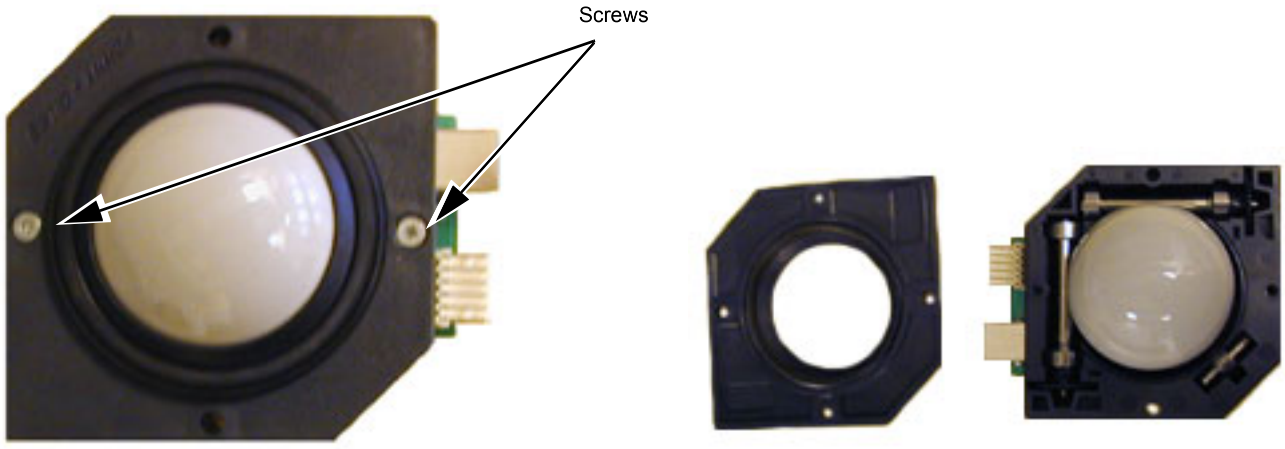
8-30-3 Preparations

1.) Shut down the system as described in Section 4-3-2 on page 4-3.
2.) Remove the Operator Panel as described in Section Section 8-27 on page 8-111.
3.) Put the panel upside down on a soft cushion.



Operator Panel with Trackball assembly

Trackball assembly



Trackball unit

Trackball housing

Figure 8-130 Trackball

8-30-4 Trackball Removal Procedure

1.) Disconnect two (2) connectors at the trackball unit and 1 at the print between trackball unit and operator panel. Remove trackball assembly.
2.) Unscrew four (4) Phillips screws on the print.
3.) Unscrew two (2) screws/nuts and remove trackball unit from print.
4.) Unscrew two (2) Phillips screws on the trackball housing.
5.) Open trackball housing, and remove trackball.

8-30-5 Trackball Installation Procedure

1.) Install trackball in housing. Replace cover and fasten removed screws.
2.) Install the trackball unit on the print and fasten removed screws/nuts.
3.) Install trackball assembly on the Operator Panel and fasten 4 screws.
4.) Connect three (3) connectors.
5.) Install Operator Panel as described in Section Section 8-27 on page 8-111.

Section 8-31
Fan Assembly Replacement Procedure

Select the movie camera icon to view the video of the monitor replacement procedure.

6 minutes and 23 seconds

8-31-1 Manpower

One person, 1 hour

8-31-2 Tools

Phillips screwdriver, size 2.

8-31-3 Preparations (click here to view the cover removal video)

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3
2.) Remove the Right and Left Covers as described on Section 8-2-2 on page 8-5.
3.) Remove Upper Rear Cover and Filter as shown in Section 8-2-3 on page 8-7.
4.) Remove the Lower Rear Cover as shown in Section 8-2-6 on page 8-10.

NOTE: There are washers and magnetic lock for Upper Rear Cover on the upper screws.

5.) Remove the Top Cover as shown in Section 8-2-4 on page 8-8.
6.) Remove the Rear Handle ashown in Section 8-2-8 on page 8-12.
7.) Remove the filter media.

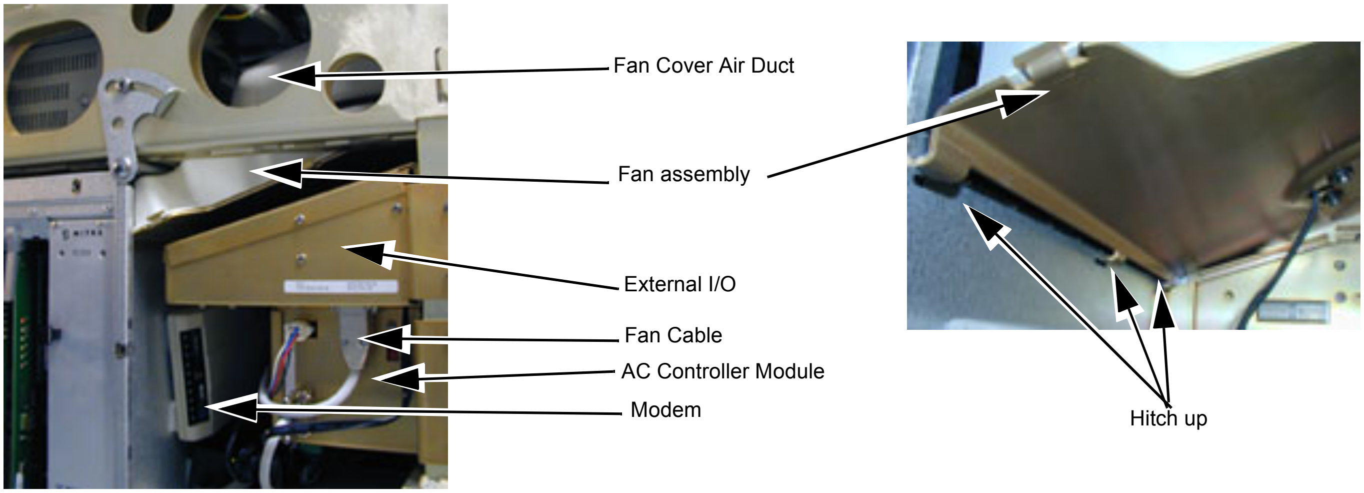


Figure 8-131 Fan Assembly, location and hitch up

8-31-4 Fan Assembly Removal Procedure

1.) Unscrew four (4) Phillips screws that fasten Cover Air Duct. See Figure 8-132.
2.) Push down the lower side of Cover Air Duct to free lower ends of the Filter Frame. Remove Filter Frame downwards.
3.) Becarful of sharp edges. Move Cover Air Duct up in the front, then backwards, off the Fan Assembly and out of the System.

8-31-4 Fan Assembly Removal Procedure (cont'd)

4.) Remove Modem and it's power supply.

5.) Disconnect all cables from the External I/O Assembly

6.) Remove External I/O. Unscrew the two Phillips screws fastening the External I/O to the chassis leg. (see External I/O Replacement Procedure on page 8-126 for more details).

7.) Unscrew the Phillips screw from the Internal I/O rear wall and pull the External I/O free from the socket on the Internal I/O.

8.) Remove the AC Controller (Refer to AC Controller Replacement Procedure on page 8-106) for more details).

9.) Disconnect the Front End Card Rack Input Voltage cable and the Fan Speed Control cable.

10.) Remove the four screws holding the AC Controller.

11.) Turn the AC Controller to gain better access and unplug the remaining cables. Ensure each cable and connector are properly marked fopr installation later.

12.) Pull out the AC Controller.

13.) Disconnect Fan Cable. See Figure 8-131.

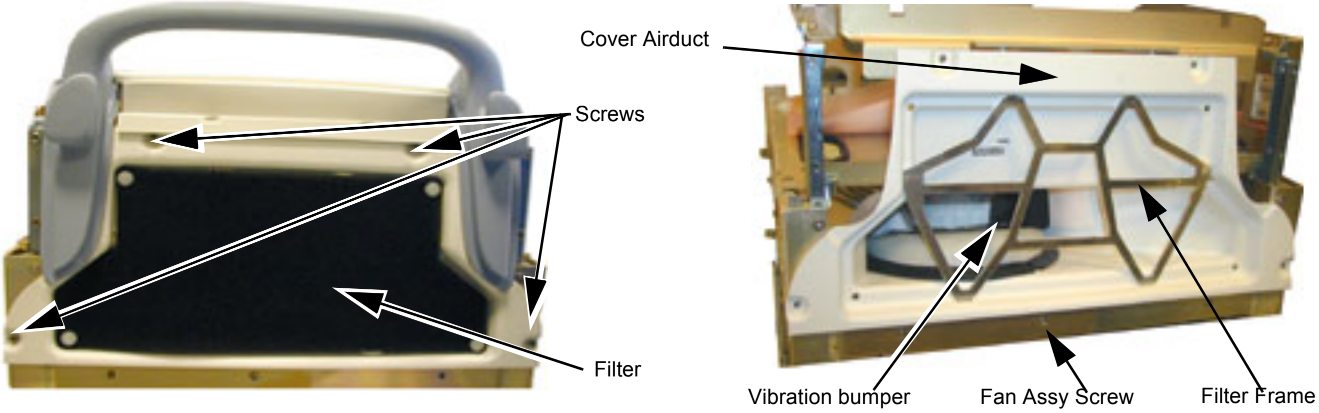


Figure 8-132 Cover Airduct

14.) Unscrew one (1) Phillips screw that fasten Fan Assembly. See Figure 8-132.

15.) Free Fan Assembly from the Board Rack sidewall hitch-up. See Figure 8-131.

16.) Push disconnected cables and connectors down and out of the way.

17.) Lower the front side of Fan Assembly and remove the Assembly carefully out the back. See Figure 8-133.

NOTE: Be careful of the External I/O Connector when removing the Fan Assembly.

8-31-4 Fan Assembly Removal Procedure (cont'd)

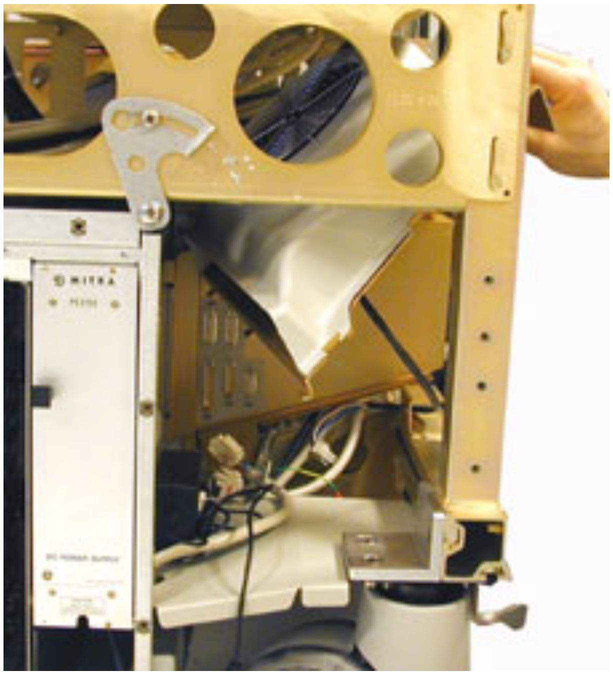


Figure 8-133 Fan Assembly Removal

8-31-5 Fan Assembly Installation Procedure

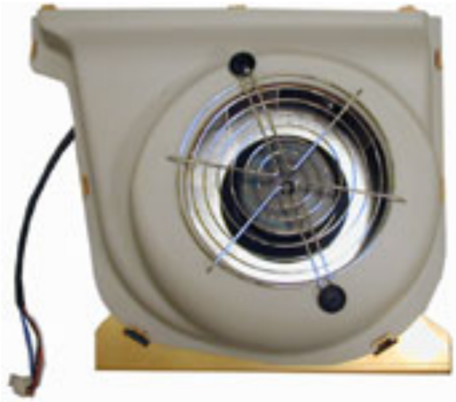


Figure 8-134 Fan Assembly

1.) Remove the shroud from the replacement Fan Assembly
2.) Thread Fan assembly in the same way as it was taken out. Be careful with the External I/O connector, located on the side of the Internal I/O.
3.) Replace the Fan Assembly Shroud.
4.) Hitch up Fan Assembly on Board Rack sidewall.
5.) Fasten the assembly to the chassis with one (1) screw.

.

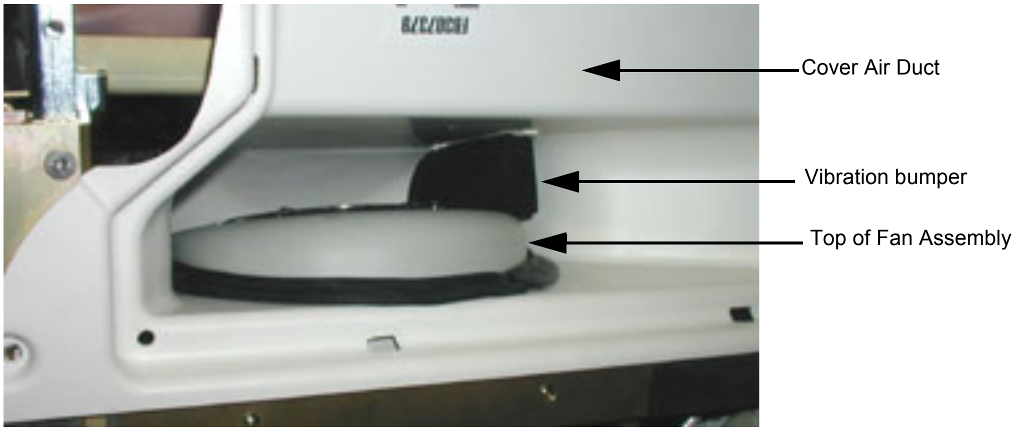


Figure 8-135 Fan Assembly in Position

6.) Replace AC Controller as described in AC Controller Replacement Procedure on page 8-106.

7.) Turn the AC Controller as necessary to facilitate connecting the cables.

8.) Secure the AC Controller to the chassis.

9.) Replace External I/O as described in Internal I/O Replacement Procedure on page 8-128.

10.) Plug the External I/O into it's socket on the Internal I/O. Replace the screw that attaches the external I/O to the Internal I/O rear wall.

11.) Replace the two screws that attach the External I/O to the chassis leg.

12.) Connect the telephone and interface cables to the rear of teh External I/O Assembly

13.) Replace the Modem and it's power supply.

14.) Reconnect the power cable from the Front End Card Rack along with the Fan Speed Control cable

15.) Install Air Duct cover. Slide it in over the Fan Assembly then reach in and force the front down over the fan.

16.) Secure the cove with four (4) screws. See Figure 8-135.

17.) Replace Filter Frame and filter media.

18.) Connect Fan cable. See Figure 8-131.

19.) Replace Lower Rear Cover, including different amount of washers and a magnetic lock for Filter Cover on the upper screws, described in Lower Rear Cover Replacement Procedure on page 8-10.

20.) Replace Rear Handle as described in Rear Handle Installation procedure on page 8-12.

21.) Replace Top Cover as described in Top Cover Replacement Procedure on page 8-8.

22.) Replace Right Side Cover as described in Side Covers (with Bumper) Replacement Procedure on page 8-5.

23.) Turn Mains Circuit Breaker ON and boot up the system as described in Section 4-3-1 on page 4-2. Put a hand on the Filter and feel that the Fan draws air into the System.

Section 8-32
External I/O Replacement Procedure

8-32-1 Manpower

1 person, 1 hour

8-32-2 Tool

Long Phillips screwdriver, size 2.

WARNING ***Do not touch any boards with integrated circuits prior to taking the necessary ESD precautions:***

1.) Always connect yourself, via an arm-wrist strap, to the advised ESD connection point located on the Rear of the scanner (to the right of the power connector).

2.) Follow general guidelines for handling of electrostatic sensitive equipment.

8-32-3 Preparations (click here to view the cover removal video)

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3.
2.) Remove the Right Side Cover as described in Section 8-2-2 on page 8-5.
3.) For full control during installation procedure: Remove the Upper Rear Cover as described in Section 8-2-3 on page 8-7 and the Lower Rear Cover in Section 8-2-6 on page 8-10.

8-32-4 External I/O Removal procedure

1.) Disconnect all cables to and from the External I/O Assembly.
2.) Unscrew two Phillips screws fastening it to the chassis leg.
3.) Unscrew the Phillips screw on the Internal I/O rear wall and pull the Assembly free from the socket it is plugged into.

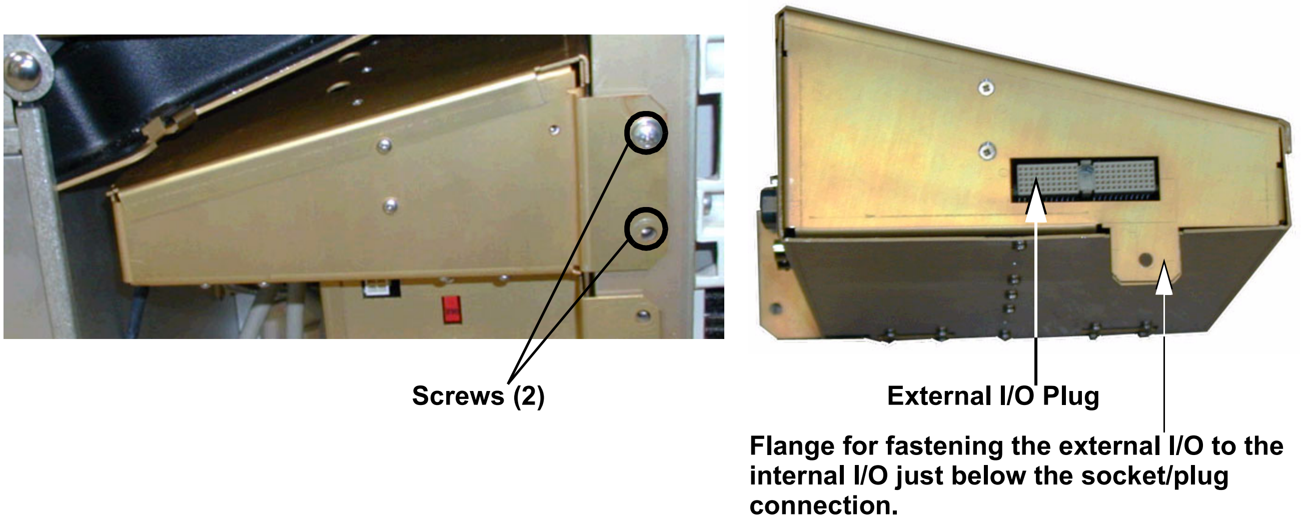

Screws (2)
External I/O Plug
Flange for fastening the external I/O to the internal I/O just below the socket/plug connection.

Figure 8-136 Side Views of the External I/O Assembly

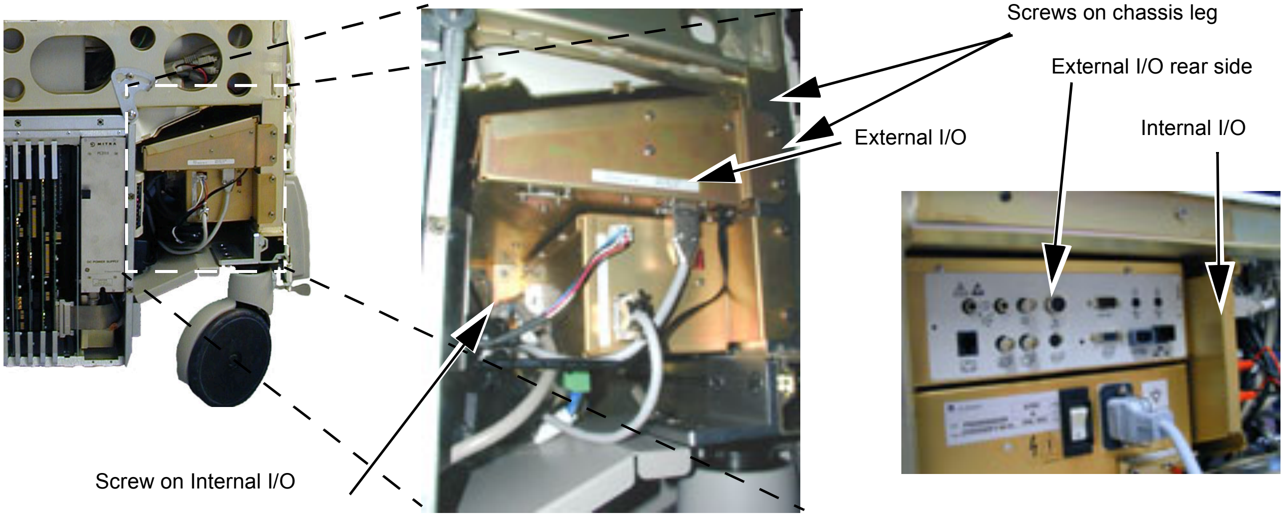


Figure 8-137 External I/O Location

8-32-5 External I/O Installation Procedure

1.) Install the new External I/O Assembly by pushing it into the socket on the rear wall of the Internal I/O and fastening it with the Phillips screw.
2.) Fasten it to the chassis leg with the two screws.
3.) Mount the Right side as described Section 8-2-2 on page 8-5.
4.) Mount the Upper Rear Cover as described in Section 8-2-3 on page 8-7 and the Lower Rear Cover in Section 8-2-6 on page 8-10.
5.) Connect all cabling to and from the External I/O. **Remember**: There are two connectors on the bottom side of the box. These two are identical in size and pinout. The left one is manufacture power cycle testing and the one on the right is for the modem connection. If they are mixed up the system will experience power up problems as soon as the modem powers on.
6.) Turn ON the Main Breaker and boot up the system as described in Section 4-3-1 on page 4-2.
7.) Do functional check-out as described.

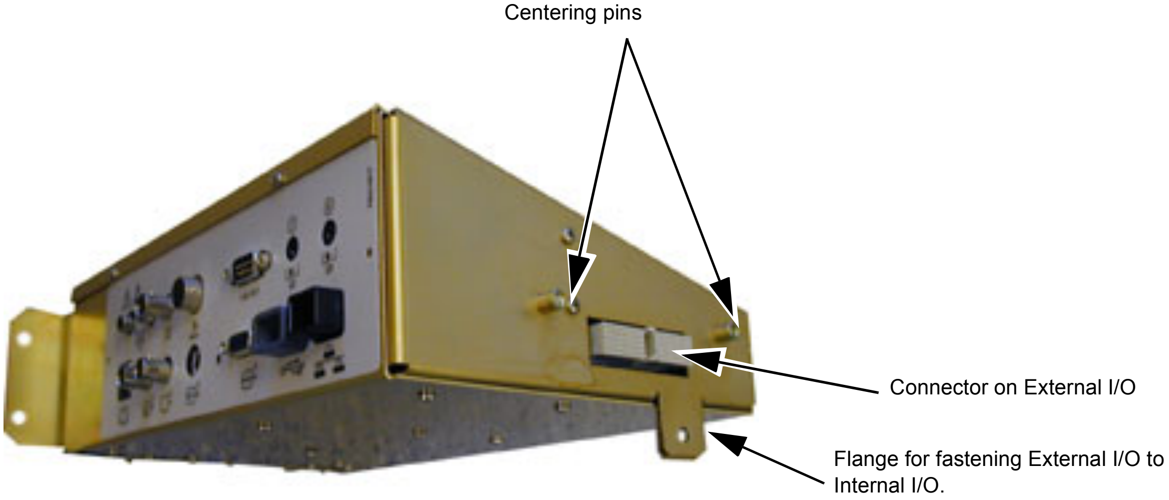

Centering pins
Connector on External I/O
Flange for fastening External I/O to Internal I/O.

Figure 8-138 External I/O Installation

Section 8-33
Internal I/O Replacement Procedure

8-33-1 Manpower

1 person, 1 hour 30 minutes

8-33-2 Tool

Long Phillips screwdriver, size 2.

WARNING ***Do not touch any boards with integrated circuits prior to taking the necessary ESD precautions:***

1.) Always connect yourself, via an arm-wrist strap, to the advised ESD connection point located on the Rear of the scanner (to the right of the power connector).

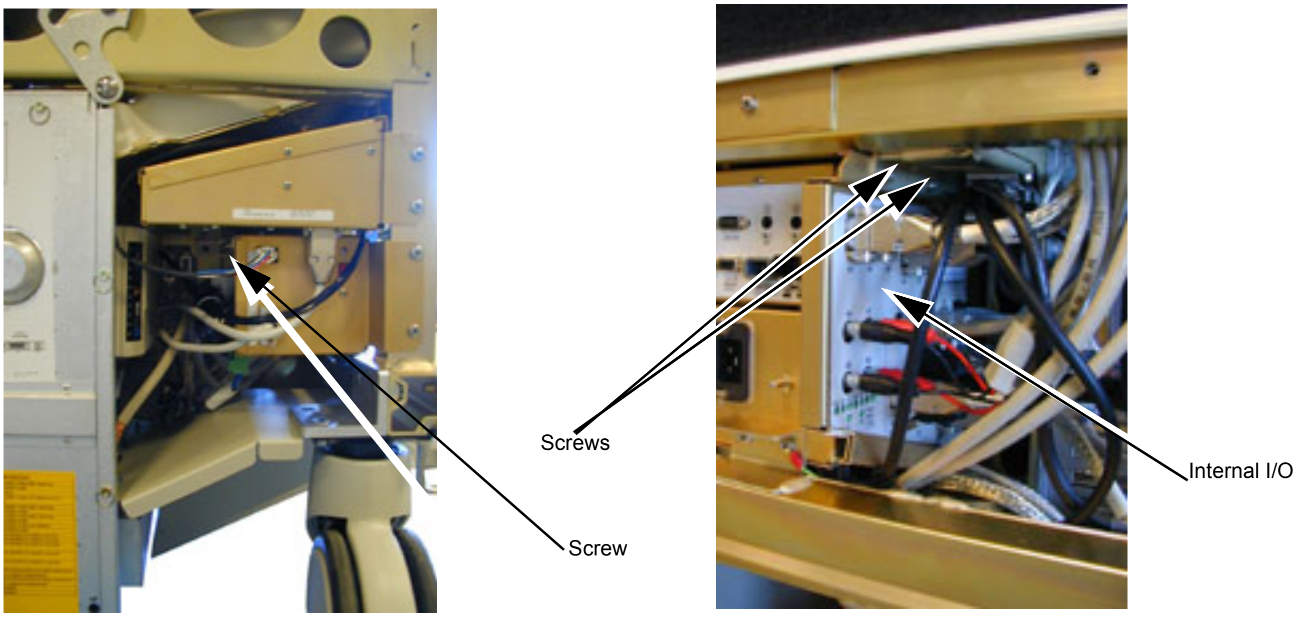
2.) Follow general guidelines for handling of electrostatic sensitive equipment.

8-33-3 Preparations (click here to view the cover removal video)

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3.
2.) Remove the Side Covers as described in Section 8-2-2 on page 8-5.
3.) Remove Rear Covers as described on Section 8-2-6 on page 8-10 and Section 8-2-3 on page 8-7.

Select the movie camera icon to view the video of the cover removal and installation procedures.

4.) Remove the External I/O as described in Section Section 8-32 on page 8-126.
5.) Disconnect the cables connected to the I/O on both sides.



External I/O side

Backend Processor side

Figure 8-139 Internal I/O Removal

8-33-4 Removal Procedure

1.) From Back End Processor (BEP) side (left side of the system), unscrew two (2) screws. These fasten the upper edge of the Internal I/O Assembly to the chassis.

2.) From External I/O side (right side), unscrew one (1) screw. This screw fasten the lower edge of Internal I/O to the chassis.

3.) Pull the Internal I/O Assembly backwards, free from its socket in the Card Rack sidewall, and out of the system.

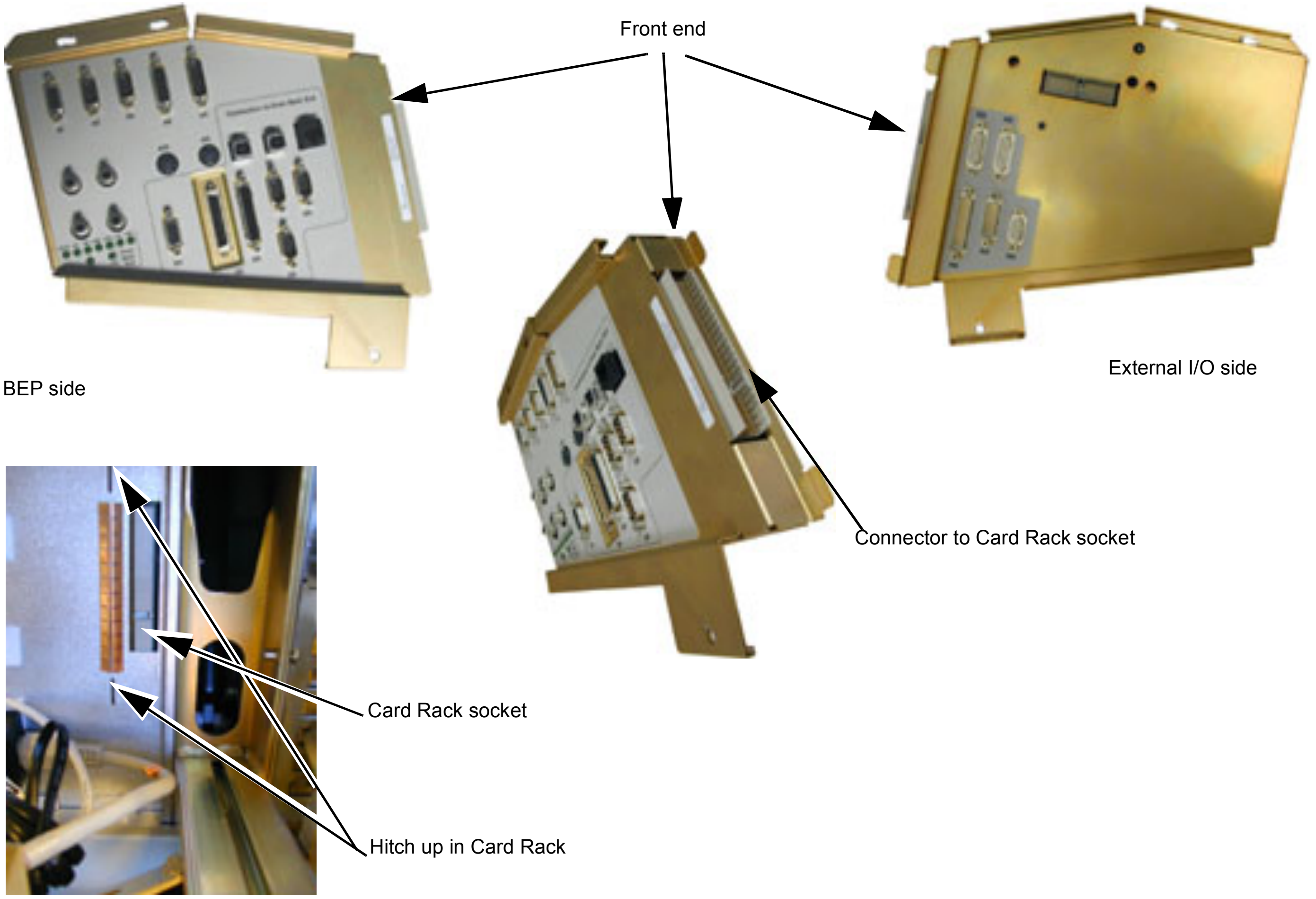


Figure 8-140 Internal I/O

8-33-5 Installation Procedure

1.) Align Internal I/O in position and push it into its card rack socket.

2.) Fasten two (2) screws on BEP side and one (1) screw on External Power side.

3.) Connect the cables to both sides of the Internal I/O.

4.) Fasten the two fastening screws.

5.) Mount the External I/O as described on Section Section 8-32 on page 8-126.

6.) Mount the Rear Cover as described on Section 8-2-6 on page 8-10 and Section 8-2-3 on page 8-7.

7.) Mount the two Side Covers as described Section 8-2-2 on page 8-5.

Section 8-34
Front End Processor Boards Replacement Procedure

8-34-1 Manpower

1 persons, 0.5 hours

8-34-2 Tools

8-34-3 Preparations (click here to view the cover removal video)

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3.

2.) Remove Right Side Cover as shown on Section 8-2-2-4 on page 8-5.

3.) Remove the Front End Processor Cover as shown in Figure 8-141.

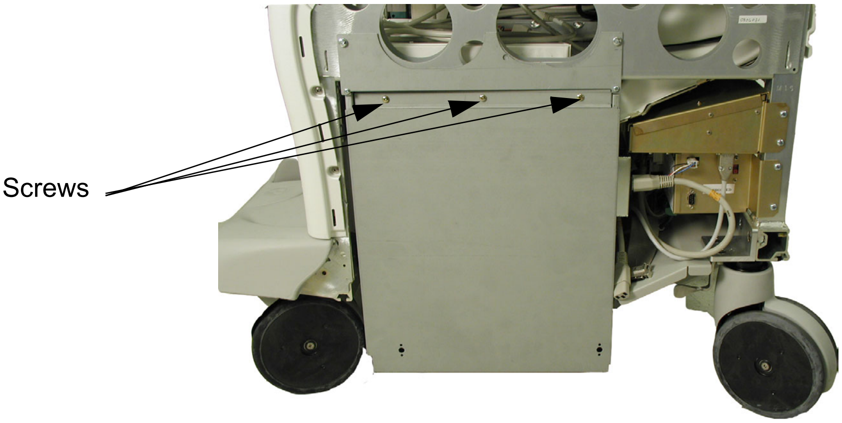


Figure 8-141 Front End Processor Location

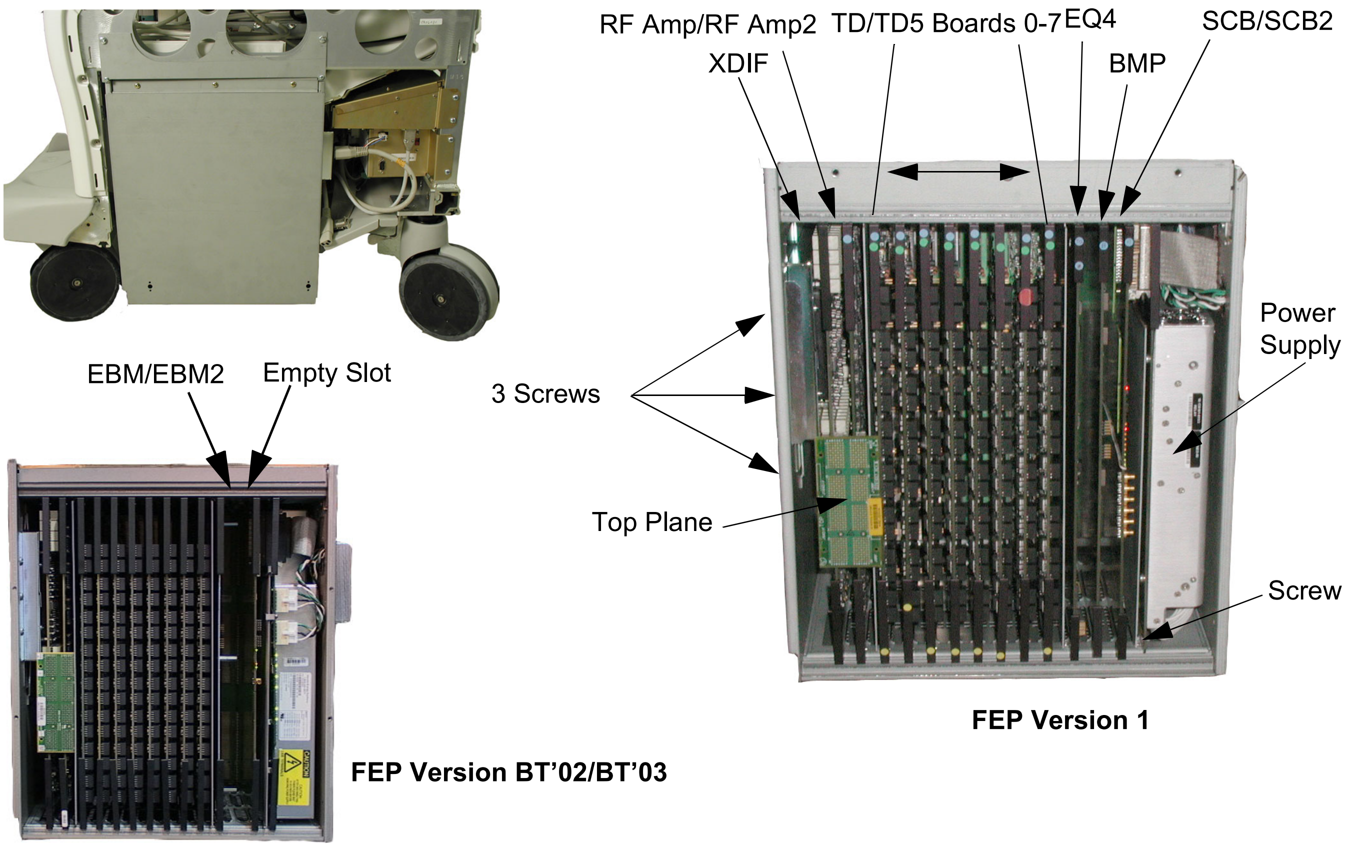
It is essential that Vital Product Data (VPD) is verified or updated after any hardware change to the Front End Processors. Refer to Section 8-35 "Verify and Update Vital Product Data" on page 8-135 for details.

NOTE: *Vital Product Data (VPD) must be verified and/or updated when Front End Boards are replaced. Failure to properly program Vital Product Data could cause adverse affects on system operation and image quality.*

Table 8-8 Typical Circuit Board VPD Data

Circuit Board Name	Part Number	Functional Revision PWA Letter	Fab Revision PWB Number	Bar Code or Serial Number	Date YYYYMMDD
Equalization	2260210				2 0 0 _ _ _ 01
					2 0 0 _ _ _ 01
					2 0 0 _ _ _ 01

8-34-4 Front End Board Removal Procedure



FEP Version 1

FEP Version BT’02/BT’03

Figure 8-142 Side View of System with Card Cage Open

The following boards are removed from the card rack with the ejectors at the top and bottom of each card. Slide the card out of the rack slowly with equal pressure on both the top and bottom of the card.

NOTE: Observe all ESD proper precautions when handling any part of the Front End Processor.

- TD Boards 0-7, EQ Board, BMP Board, EBM/EBM2 Board

⚠ **CAUTION** **The following boards require special attention when removing them from the card rack. READ the hints that follow to avoid damage to the system or personal injury.**

- XDIF and RF Amp/RF Amp2

a.) Remove the three screws that fasten the XDIF board to the front of the card rack chassis.

b.) Carefully eject and partially remove the XDIF and RF Amp boards simultaneously. Remove the boards just enough in order to grab both sides of the Top Plane board.

c.) Hold the XDIF and RF Amp boards. Carefully grab each SIDE of the Top Plane Board. Gently rock the Top Plane board side to side while pulling it off of its connectors.

NOTE: Rocking the Top Plane board top to bottom will afford a greater opportunity to bend pins during its extraction. Only rock the board side-to-side while removing it.

d.) Once the Top Plane Board is removed, either the XDIF or RF Amp can be removed from the card rack.

8-34-4 Front End Board Removal Procedure (cont'd)

- SCB/SCB2 and Power Supply (FEPS, FEPS2, FEPS2.1, FEPS3)

⚠ **WARNING** ***Ensure that the system is turned off and unplugged. Wait at least 20 seconds for the charge on the FEPS capacitors to bleed off before handling the power supply board.***

a.) For the old supplies, remove the one screw at the bottom of the Power Supply Board.
b.) If necessary, unscrew the two thumb screws attaching a cover plate over the PCI cable as it enters the card rack chassis.
c.) Partially remove the SCB and Power Supply boards simultaneously. Remove them just enough to gain access to the PCI cable from the Back End Processor that passes through the Power Supply board and attaches to the SCB.
d.) Disconnect the PCI cable from the SCB and pull it through the hole in the Power Supply board.
e.) If you are removing just the SCB, completely slide it out of the card rack.
f.) If you are removing the Power Supply board, pull the PCI cable out of the card rack chassis so it will not interfere with the Power Supply board.
g.) Pull the Power Supply board out of the rack to expose the black/white/green AC input wires.
h.) Disconnect these wires from the Power Supply board and slide the board out of the card rack.

8-34-5 Front End Board Installation Procedure

- The TD Boards 0-7, EQ Board, BMP Board and EBM/EBM2

a.) Installation is accomplished by sliding the top and bottom edges of the board into the guide slots with firm even pressure to securely seat the board into the motherboard and secure it with the ejectors.

- XDIF, RF Amp/RF Amp2 and Top Plane

a.) When inserting the XDIF board back into the card rack, ensure that the RF shield is behind the card rails to avoid binding.
b.) Slide the XDIF in and secure it with the three screws.
c.) Slide in the RF Amp.
d.) Install the Top Plane board by first aligning the pins and then pushing straight in to seat the board.

- SCB and Power Supply (FEPS, FEPS2, FEPS2.1, FEPS3)

a.) The SCB and Power Supply Boards should be started simultaneously but not pushed in all the way.
b.) Reconnect the black/white/green AC input wires on the Power Supply board.
c.) Thread the PCI cable through the chassis and Power Supply board and connect it to the SCB.
d.) Simultaneously seat the SCB and Power Supply boards into motherboard.
e.) If removed, replace the RF shield over the PCI Cable chassis hole.
f.) Since there is no ejector at the bottom of the Power Supply board, be sure to push firmly on the bottom to completely seat the card. Secure the bottom of the Power Supply board with the screw previously removed.

- FEPS2 Power Supply Differences
  - a.) There is more room to remove the PCI cable from the Scan Control Board and pull it through the hole in the FEPS2.
  - b.) Two AC connections are still required but are mounted on front of the FEPS2 for easy access.
  - c.) The FEPS2 has two card ejectors so the screw in the bottom corner is not required to secure the supply.
  - d.) A special copper ground tab and ground plane grabber are incorporated in the FEPS2 to ensure good contact to the FEP card rack.
  - e.) A different FEP cover is needed, when an FEPS2 is installed, to add additional shielding around the Top Plane Board connecting the XDIF to the RF Amp.
  - f.) It is important that **ALL** screws be used when replacing the Front End Processor Cover.

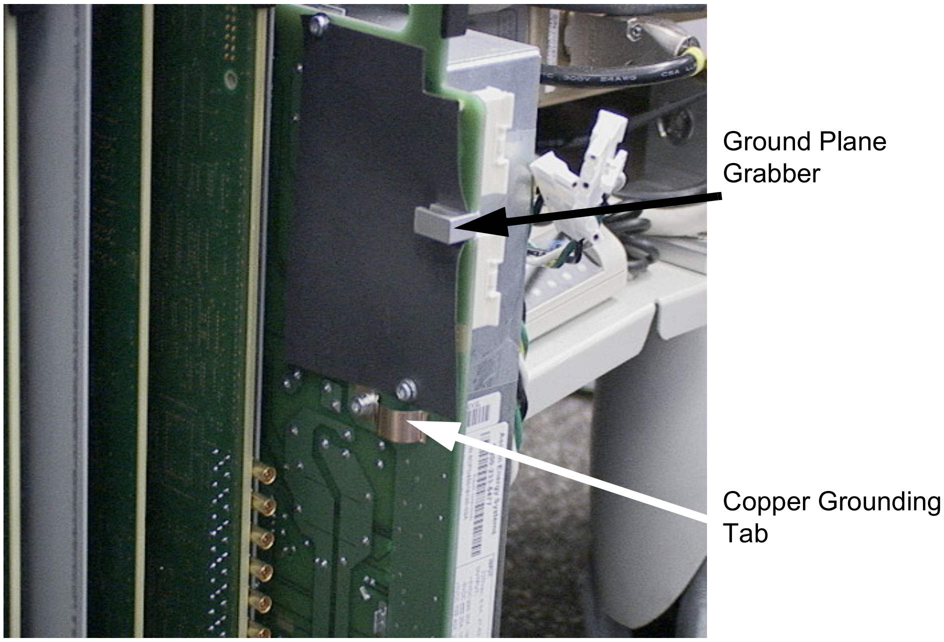


Figure 8-143 FEPS2 Grounding Points

- FEPS3 Differences
  - a.) FEPS3 Power Supplies must be used with TD5 and RF AMP2 Front End card racks. The +/-6V and 13V produced are required for these boards. Refer to Table 5-2 on page 5-6.
  - b.) Therefore, the FEPS3 **can not** be used with Front End card racks prior to R3.0.0 Software (BT'03).

- Installing the FEPS2/FEPS3

When installing the FEPS2/;FEPS3 in a LOGIQ™ 9 Front End Card Rack, special attention needs to be paid to the grounding points.

1.) Slide the FEPS2/FEPS3 in the card rack rails. See Figure 8-143 on page 8-133 .
    - Ensure that the ground plane separating the SCB and FEPS2/;FEPS3 boards will slide into the ground plane grabber on the edge of the FEPS2/;FEPS3.
    - Ensure that the copper grounding tab will make contact with the ground plane separating the SCB and FEPS2/;FEPS3 boards.
2.) Feed the PCI cable through the FEPS2/;FEPS3 and connect it to the SCB.
3.) Connect the two AC cables to the FEPS2/;FEPS3.
4.) Use the card ejectors to seat the boards pressing firmly on the top and bottom of the cards.
5.) Double check all ground plane contacts.
6.) When installing the FEP cover, ensure you use the new cover with the shielding riveted in the top plane area.

NOTE: Check the routing of the PCI cable through the Power Supply board. Ensure there are no loops in the PCI cable that could short to test points or any part of the Power Supply.

c.) The RF gasket on the inside of the Front End Processor cover MUST make good contact with the Front End Processor card cage. To get a tight fit with the gasket, loosely fit all screws through the cover into the card cage. Apply pressure to the bottom of the cover forcing it upward as you tighten all screws from the bottom up.

Section 8-35
Verify and Update Vital Product Data

8-35-1 Introduction

It is essential that Vital Product Data (VPD) is verified or updated after any hardware change to the Back End or Front End Processors.

NOTE: *Failure to properly program Vital Product Data could cause adverse affects on system operation and image quality.*

The items of concern are:

- Verify that the Board or BEP Vital Product Gata is programmed
- Program the new Board or BEP Vital Product data. (BEP VPD is stored on the FEP backplane).

8-35-2 Collecting Vital Product Data

For the Back End Processor, remove the system left side cover and read the label on the front of the processor. The Part Number is there. The Functional Revision is the PSP# (number) on the label. Get the date for the BEP from this BEP rating plate. All other dates are taken from the Console rating plate.

If the VPD Read Utility (8-35-3-3 "Acquisition Diagnostics - Read EEPROM Data" on page 8-138) shows no data for the Equalization Board (EQ), obtain that data by removing the system right side cover, remove the FEP cover, remove the EQ Board and obtain the data indicated in Table 8-9.

Table 8-9 BEP VPD Data

Circuit Board Name	Part Number	Functional Revision PWA Letter	Fab Revision PWB Number	Bar Code or Serial Number	Date YYYYMMDD
BEP	BEP Rating Plate	PSP Revison	N/A	No Dash Allowed	BEP Rating Plate 2 0 0 _ _ _ 01

Table 8-10 Typical Circuit Board VPD Data

Circuit Board Name	Part Number	Functional Revision PWA Letter	Fab Revision PWB Number	Bar Code or Serial Number	Date YYYYMMDD
Equalization	2260210				2 0 0 _ _ _ 01

8-35-2 Collecting Vital Product Data (cont'd)

Table 8-11 VPD Data Collection

Circuit Board Name	Part Number	Functional Revision PWA Letter	Fab Revision PWB Number	Bar Code or Serial Number	Date YYYYMMDD
BM Processor	2260207	Do Not Update			2 0 0 _ _ _ 01
Backplane	2260219	A	1	012345	2 0 0 _ _ _ 01
Console	From Rating Plate Only -2 can be entered	N/A	N/A		2 0 0 _ _ _ 01
BEP	BEP Rating Plate Only -3 can be entered	PSP Revison -2 after upgrade	N/A	No Dash Allowed	BEP Rating Plate 2 0 0 _ _ _ 01
Equalization	2260210				2 0 0 _ _ _ 01
EBM	2273639				2 0 0 _ _ _ 01
Power Supply	2260203 / 2273641 / 2376843 / 2260203				2 0 0 _ _ _ 01
RF Amplifier	2260212 / 2341985 / 2357621				2 0 0 _ _ _ 01
Scan Control	2260214 / 2365739				2 0 0 _ _ _ 01
Time Delay 0	2260194 / 2362863				2 0 0 _ _ _ 01
Time Delay 1	2260194 / 2362863				2 0 0 _ _ _ 01
Time Delay2	2260194 / 2362863				2 0 0 _ _ _ 01
Time Delay 3	2260194 / 2362863				2 0 0 _ _ _ 01
Time Delay 4	2260194 / 2362863				2 0 0 _ _ _ 01
Time Delay 5	2260194 / 2362863				2 0 0 _ _ _ 01
Time Delay 6	2260194 / 2362863				2 0 0 _ _ _ 01
Time Delay 7	2260194 / 2362863				2 0 0 _ _ _ 01
Transducer Interface	2260221				2 0 0 _ _ _ 01
PC2IP	Not a FRU	Part of BEP. Not Updated			

8-35-3 How to Update Vital Product Data on LOGIQ™ 9

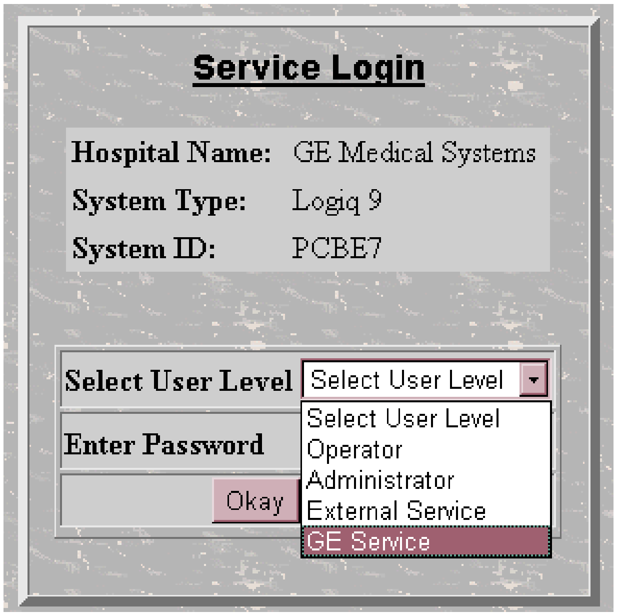
8-35-3-1 Initial Steps

The System should be in the scan mode. If not:

1.) Properly shut down the system.
2.) Plug in the service dongle to the USB Port on the External I/O.
3.) Power up system

8-35-3-2 Start Service Platform

1.) Right Click on the *Wrench* icon to start the service platform.
2.) A dialog box appears "Service Platform is starting ..."
3.) It will take a few seconds for the Service Login to appear. Select login as *GE Service*



Service Login

Hospital Name: GE Medical Systems
System Type: Logiq 9
System ID: PCBE7

Select User Level GE Service
Enter Password

Figure 8-144 Service Login Screen

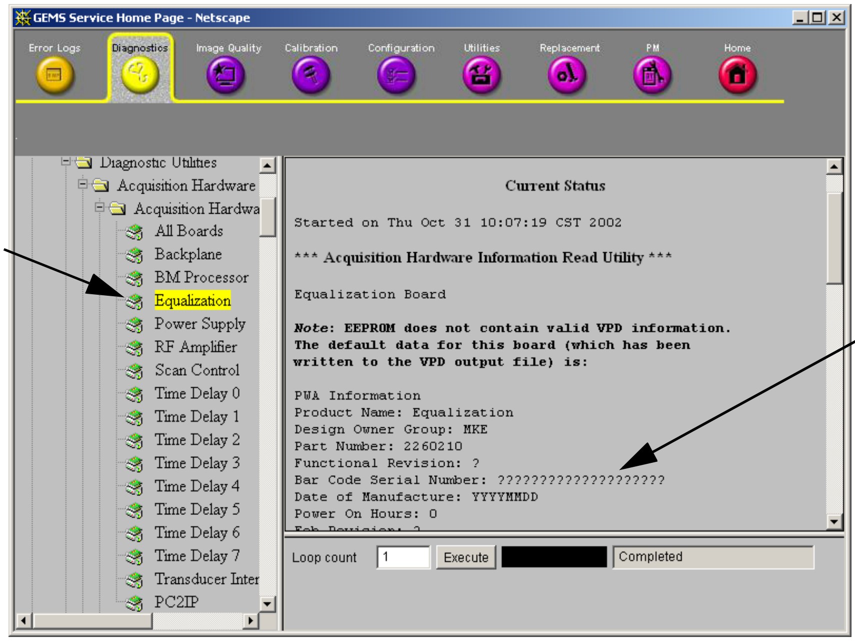
4.) Enter current Service Password for Service Diagnostics.

NOTE: Remember that the Caps Lock must be OFF.

8-35-3-3 Acquisition Diagnostics - Read EEPROM Data

Navigate to the following menu location:

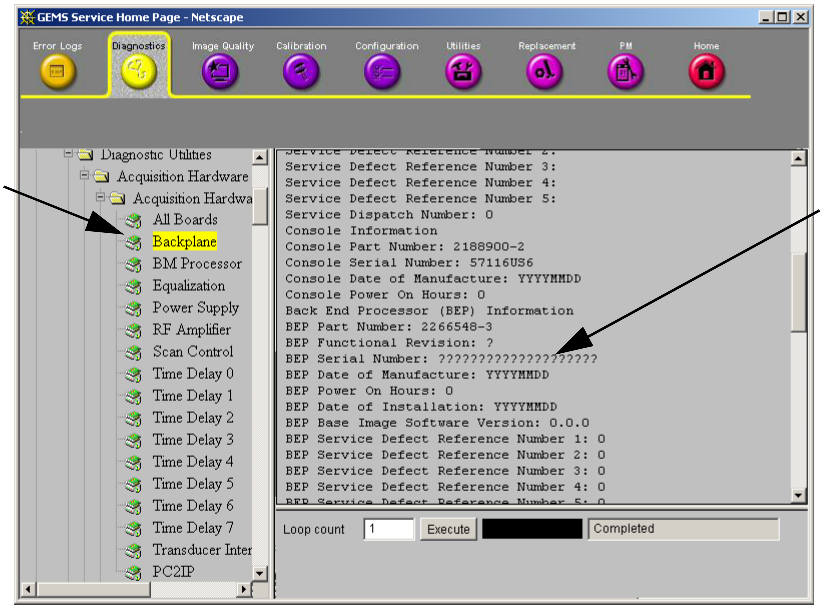
1.) Acquisition Diagnostics>Diagnostic Groups>Diagnostic Utilities>Acquisition Hardware Information Utilities>Acquisition Hardware Information Read Utilities.



```
Current Status

Started on Thu Oct 31 10:07:19 CST 2002

*** Acquisition Hardware Information Read Utility ***

Equalization Board

Note: EEPROM does not contain valid VPD information.
The default data for this board (which has been
written to the VPD output file) is:

PWA Information
Product Name: Equalization
Design Owner Group: MKE
Part Number: 2260210
Functional Revision: ?
Bar Code Serial Number: ????????????????????
Date of Manufacture: YYYYMMDD
Power On Hours: 0
```

Figure 8-145 Read EQ Board VPD

NOTE: If VPD Data is not present the proceed with updating VPD Data.



```
Service Defect Reference Number 3:
Service Defect Reference Number 4:
Service Defect Reference Number 5:
Service Dispatch Number: 0
Console Information
Console Part Number: 2188900-2
Console Serial Number: 57116US6
Console Date of Manufacture: YYYYMMDD
Console Power On Hours: 0
Back End Processor (BEP) Information
BEP Part Number: 2266548-3
BEP Functional Revision: ?
BEP Serial Number: ????????????????????
BEP Date of Manufacture: YYYYMMDD
BEP Power On Hours: 0
BEP Date of Installation: YYYYMMDD
BEP Base Image Software Version: 0.0.0
BEP Service Defect Reference Number 1: 0
BEP Service Defect Reference Number 2: 0
BEP Service Defect Reference Number 3: 0
BEP Service Defect Reference Number 4: 0
```

Figure 8-146 Read Backplane VPD

8-35-3-3Acquisition Diagnostics - Read EEPROM Data (cont'd)

Under this menu you will see a listing for each board that has an EEPROM with a location for Vital Product Data, see Figure 8-145 and Figure 8-146. The Board Data can be read individually or there is also a Read All Boards Utility.

2.) Click on the Backplane and Equalization items and select the *Execute* button to read the contents of the EEPROM on each circuit board. This will create two files for each board in the *C:/Musashi/target/RW/Diagnostics* directory. The files generated are a *.txt and *.dat file. The *.txt file will be the working file to edit where the *.dat file will be the file showing the actual hexadecimal data stored in the memory chip.

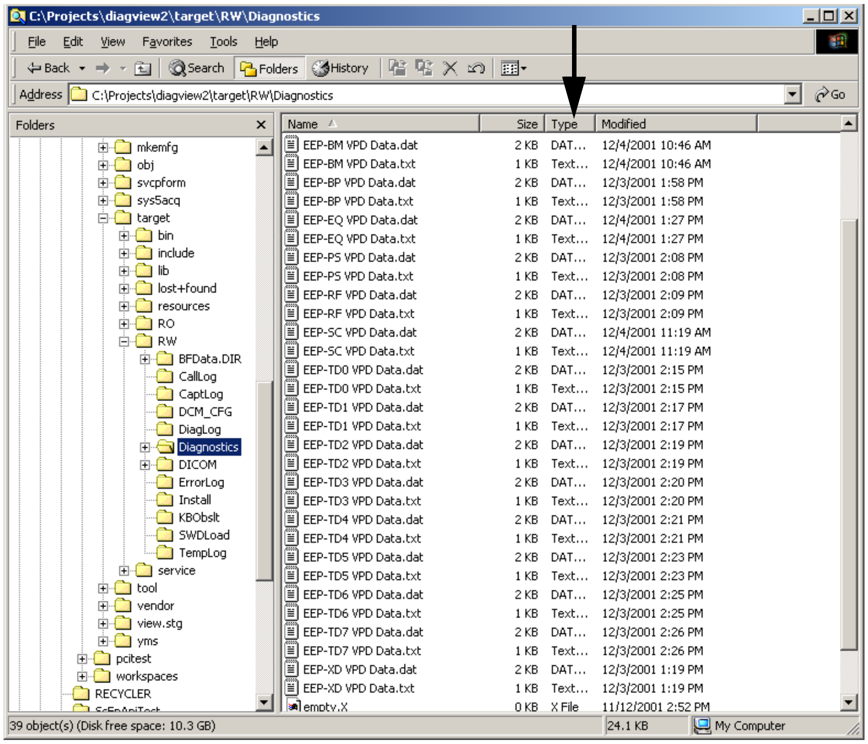
8-35-3-4 Modify VPD Text Files

Once data has been read back successfully and all files have been created, you are now ready to modify the contents of the *.txt file and write the data back.

1.) Open Windows Explorer via the CTRL-ALT-DEL method. Press CTRL-ALT-DEL simultaneously, select Task Manager, select New Task - Run, type in "*explorer*" in the Create New Task dialog box and select OK. If no Explorer window is open, click on the Explorer icon in the task bar to open a window.

2.) In Windows Explorer, navigate to *C:/Musashi/target/RW/Diagnostics*. Here you will see all the *.txt and *.dat files you have just created via the Read Utility. Each of the VPD files will have the prefix of "EEP-".

8-35-3-4Modify VPD Text Files (cont'd)



Name	Size	Type	Modified
EEP-BM VPD Data.dat	2 KB	DAT...	12/4/2001 10:46 AM
EEP-BM VPD Data.txt	1 KB	Text...	12/4/2001 10:46 AM
EEP-BP VPD Data.dat	2 KB	DAT...	12/3/2001 1:58 PM
EEP-BP VPD Data.txt	1 KB	Text...	12/3/2001 1:58 PM
EEP-EQ VPD Data.dat	2 KB	DAT...	12/4/2001 1:27 PM
EEP-EQ VPD Data.txt	1 KB	Text...	12/4/2001 1:27 PM
EEP-PS VPD Data.dat	2 KB	DAT...	12/3/2001 2:08 PM
EEP-PS VPD Data.txt	1 KB	Text...	12/3/2001 2:08 PM
EEP-RF VPD Data.dat	2 KB	DAT...	12/3/2001 2:09 PM
EEP-RF VPD Data.txt	1 KB	Text...	12/3/2001 2:09 PM
EEP-SC VPD Data.dat	2 KB	DAT...	12/4/2001 11:19 AM
EEP-SC VPD Data.txt	1 KB	Text...	12/4/2001 11:19 AM
EEP-TD0 VPD Data.dat	2 KB	DAT...	12/3/2001 2:15 PM
EEP-TD0 VPD Data.txt	1 KB	Text...	12/3/2001 2:15 PM
EEP-TD1 VPD Data.dat	2 KB	DAT...	12/3/2001 2:17 PM
EEP-TD1 VPD Data.txt	1 KB	Text...	12/3/2001 2:17 PM
EEP-TD2 VPD Data.dat	2 KB	DAT...	12/3/2001 2:19 PM
EEP-TD2 VPD Data.txt	1 KB	Text...	12/3/2001 2:19 PM
EEP-TD3 VPD Data.dat	2 KB	DAT...	12/3/2001 2:20 PM
EEP-TD3 VPD Data.txt	1 KB	Text...	12/3/2001 2:20 PM
EEP-TD4 VPD Data.dat	2 KB	DAT...	12/3/2001 2:21 PM
EEP-TD4 VPD Data.txt	1 KB	Text...	12/3/2001 2:21 PM
EEP-TD5 VPD Data.dat	2 KB	DAT...	12/3/2001 2:23 PM
EEP-TD5 VPD Data.txt	1 KB	Text...	12/3/2001 2:23 PM
EEP-TD6 VPD Data.dat	2 KB	DAT...	12/3/2001 2:25 PM
EEP-TD6 VPD Data.txt	1 KB	Text...	12/3/2001 2:25 PM
EEP-TD7 VPD Data.dat	2 KB	DAT...	12/3/2001 2:26 PM
EEP-TD7 VPD Data.txt	1 KB	Text...	12/3/2001 2:26 PM
EEP-XD VPD Data.dat	2 KB	DAT...	12/3/2001 1:19 PM
EEP-XD VPD Data.txt	1 KB	Text...	12/3/2001 1:19 PM
empty.X	0 KB	X File	11/12/2001 2:52 PM

39 object(s) (Disk free space: 10.3 GB) | 24.1 KB | My Computer

Figure 8-147 Example of *.txt and *.dat File Listing

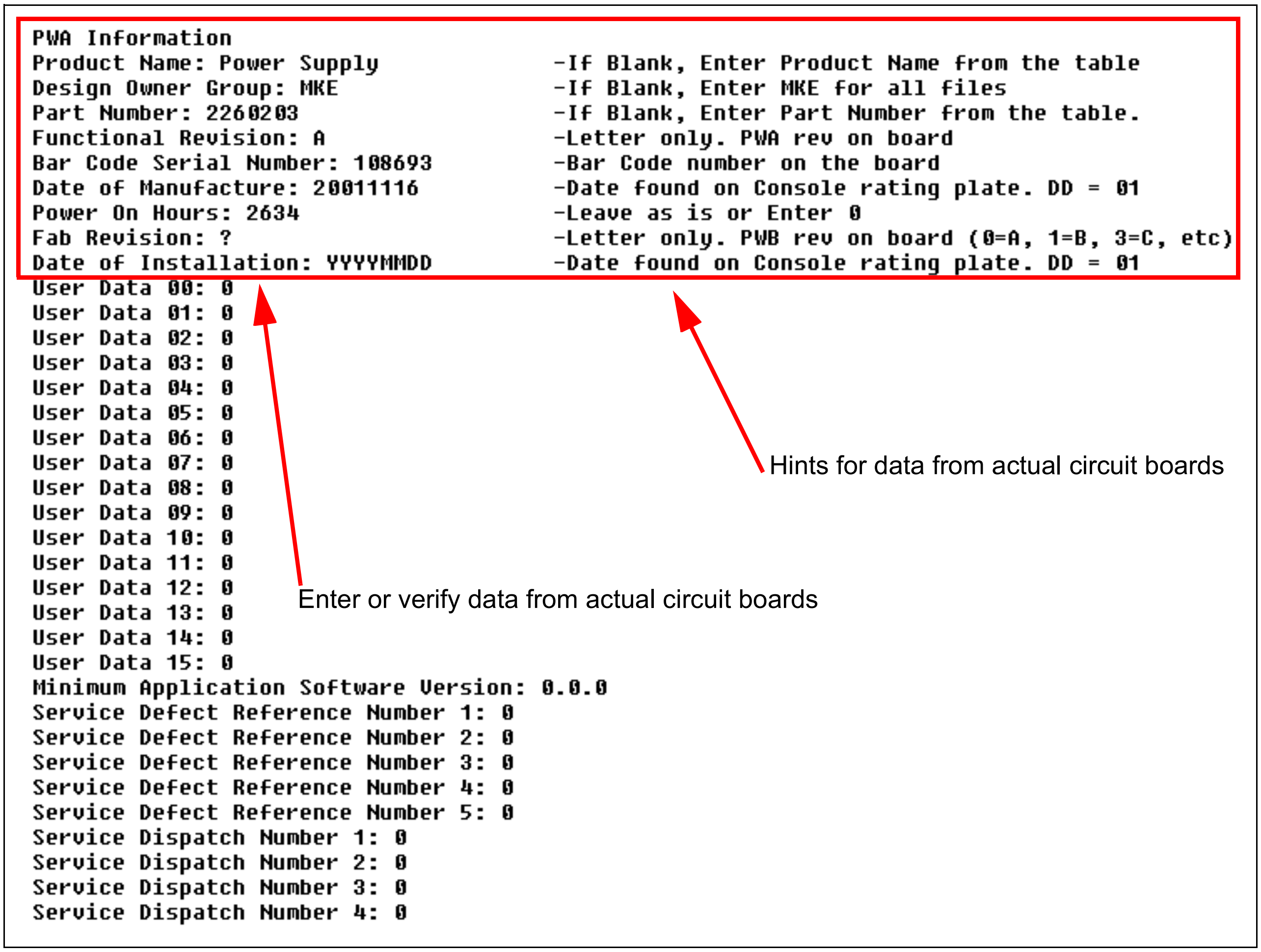
Hints for Working with the Text Files

- Sort the files in the Explorer window, Figure 8-147, by clicking on the file TYPE heading. This will sort the files and put the .txt files in one contigious group.
- With the files sorted, to highlight all text files:
  - Cursor to the first text file and press the Right-**SET** key.
  - Cursor to the last file, hold down the **SHIFT** key and press the Right-**SET** key.
  - All files should be highlighted.
  - Ensure that the cursor is in the highlighted file area and press the Left-**SET** key.
  - In the drop down menu, cursor to OPEN and press the Right-**SET** key.
  - All text files will open up in Note Pad

Notes For VPD Text File Editing

- There needs to be one (**1**) space between the colon (**:**) and the first character of the data string.
- **NO** spaces, characters, tabs, etc. at the end of the data string. Do a Fn-End (Function-End) on the LOGIQ™ 9 keyboard to see the actual end of the line. Delete all spaces by back spacing to the text string.
- Double click on a word to select it for editing.
- Copy a field like the date for multiple pasting by:
  - Double clicking on the edited date field to select it.
  - CTRL - C to copy the field.
  - Double clicking on the next field to edit.
  - CTRL-V to paste in the copied text.
  - You can do multiple CTRL-V operations for the text until you do another CTRL-C.
- Use the board descriptions listed in Table 8-10 recorded prior to replacing a board.
- The Back End Processor data is edited in the Backplane text file.
- The file defaults values may have ?????? in a field, however this must be changed to alpha or alpha-numberic characters (whichever is valid for the field being updated).
- Some boards may already have data present (no ??????). If this is the case, simply verify the data present with that recorded in the table and correct it if necessary.
- The EEP-PC VPD Data.txt file is for the PC2IP Board which is part of the Back End Processor FRU. This file does not need to be updated.

NOTE: Figure 8-148 on page 8-142 *and* Figure 8-150 on page 8-143 *provide an example of a circuit board text file and backplane text file, with hints, for reference. Proceed to page* 145 *for further text processing.*

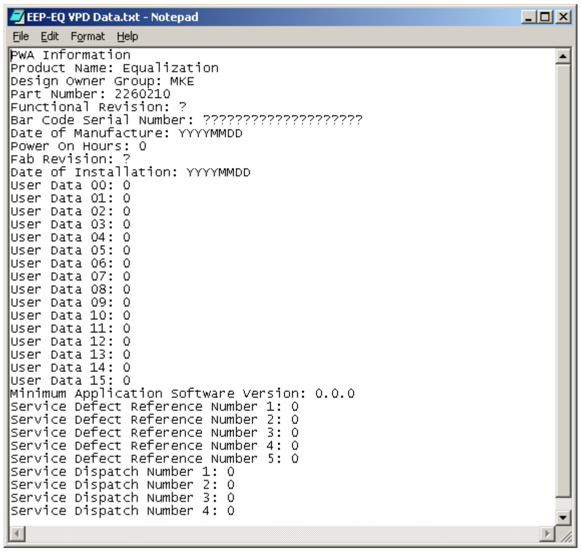


```
PWA Information
Product Name: Power Supply             -If Blank, Enter Product Name from the table
Design Owner Group: MKE                -If Blank, Enter MKE for all files
Part Number: 2260203                   -If Blank, Enter Part Number from the table.
Functional Revision: A                 -Letter only. PWA rev on board
Bar Code Serial Number: 108693         -Bar Code number on the board
Date of Manufacture: 20011116          -Date found on Console rating plate. DD = 01
Power On Hours: 2634                   -Leave as is or Enter 0
Fab Revision: ?                        -Letter only. PWB rev on board (0=A, 1=B, 3=C, etc)
Date of Installation: YYYYMMDD         -Date found on Console rating plate. DD = 01
User Data 00: 0
User Data 01: 0
User Data 02: 0
User Data 03: 0
User Data 04: 0
User Data 05: 0
User Data 06: 0
User Data 07: 0
User Data 08: 0
User Data 09: 0
User Data 10: 0
User Data 11: 0
User Data 12: 0
User Data 13: 0
User Data 14: 0
User Data 15: 0
Minimum Application Software Version: 0.0.0
Service Defect Reference Number 1: 0
Service Defect Reference Number 2: 0
Service Defect Reference Number 3: 0
Service Defect Reference Number 4: 0
Service Defect Reference Number 5: 0
Service Dispatch Number 1: 0
Service Dispatch Number 2: 0
Service Dispatch Number 3: 0
Service Dispatch Number 4: 0
```

Hints for data from actual circuit boards

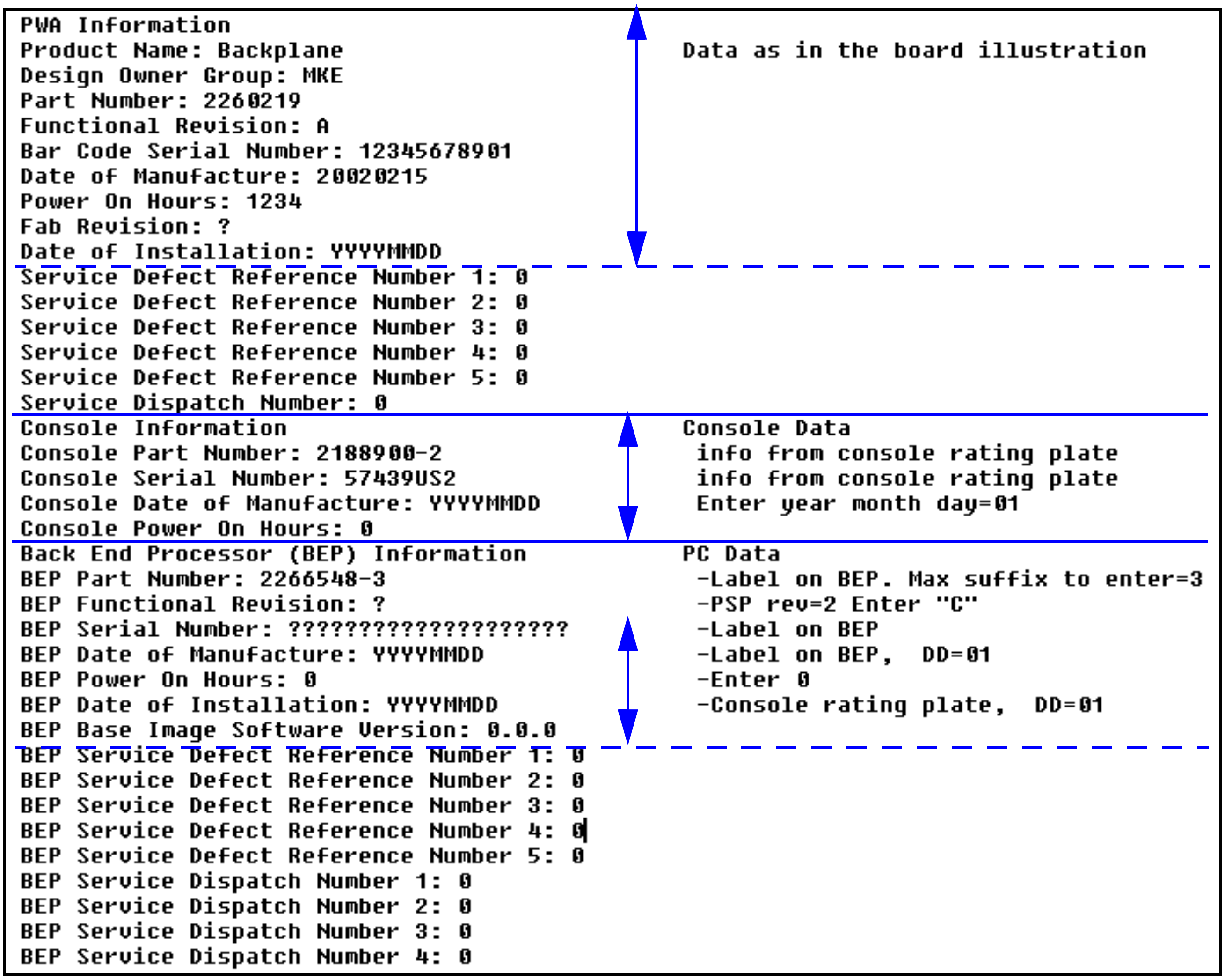
Enter or verify data from actual circuit boards

Figure 8-148 Example of a Circuit Board Text File with Hints



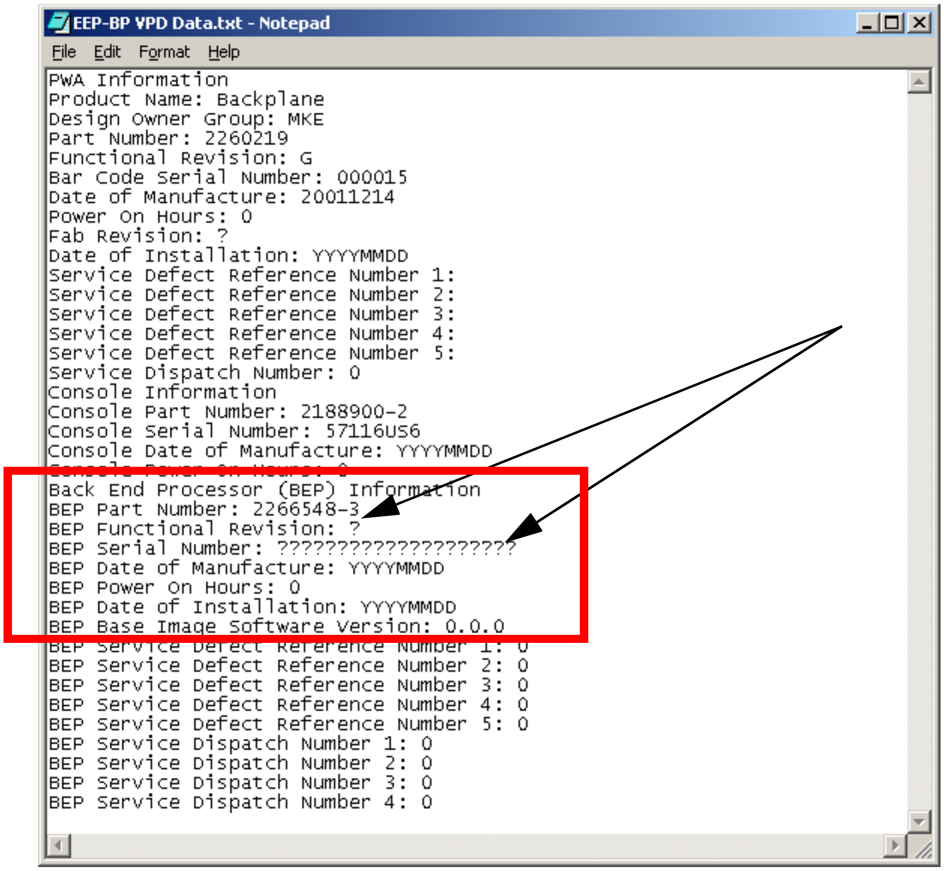
```
PWA Information
Product Name: Equalization
Design Owner Group: MKE
Part Number: 2260210
Functional Revision: ?
Bar Code Serial Number: ????????????????????
Date of Manufacture: YYYYMMDD
Power On Hours: 0
Fab Revision: ?
Date of Installation: YYYYMMDD
User Data 00: 0
User Data 01: 0
User Data 02: 0
User Data 03: 0
User Data 04: 0
User Data 05: 0
User Data 06: 0
User Data 07: 0
User Data 08: 0
User Data 09: 0
User Data 10: 0
User Data 11: 0
User Data 12: 0
User Data 13: 0
User Data 14: 0
User Data 15: 0
Minimum Application Software Version: 0.0.0
Service Defect Reference Number 1: 0
Service Defect Reference Number 2: 0
Service Defect Reference Number 3: 0
Service Defect Reference Number 4: 0
Service Defect Reference Number 5: 0
Service Dispatch Number 1: 0
Service Dispatch Number 2: 0
Service Dispatch Number 3: 0
Service Dispatch Number 4: 0
```

Figure 8-149 EQ Board Text File



```
PWA Information
Product Name: Backplane                              Data as in the board illustration
Design Owner Group: MKE
Part Number: 2260219
Functional Revision: A
Bar Code Serial Number: 12345678901
Date of Manufacture: 20020215
Power On Hours: 1234
Fab Revision: ?
Date of Installation: YYYYMMDD
Service Defect Reference Number 1: 0
Service Defect Reference Number 2: 0
Service Defect Reference Number 3: 0
Service Defect Reference Number 4: 0
Service Defect Reference Number 5: 0
Service Dispatch Number: 0
Console Information                                  Console Data
Console Part Number: 2188900-2                        info from console rating plate
Console Serial Number: 57439US2                       info from console rating plate
Console Date of Manufacture: YYYYMMDD                 Enter year month day=01
Console Power On Hours: 0
Back End Processor (BEP) Information                 PC Data
BEP Part Number: 2266548-3                            -Label on BEP. Max suffix to enter=3
BEP Functional Revision: ?                            -PSP rev=2 Enter "C"
BEP Serial Number: ????????????????????               -Label on BEP
BEP Date of Manufacture: YYYYMMDD                     -Label on BEP,  DD=01
BEP Power On Hours: 0                                 -Enter 0
BEP Date of Installation: YYYYMMDD                    -Console rating plate,  DD=01
BEP Base Image Software Version: 0.0.0
BEP Service Defect Reference Number 1: 0
BEP Service Defect Reference Number 2: 0
BEP Service Defect Reference Number 3: 0
BEP Service Defect Reference Number 4: 0
BEP Service Defect Reference Number 5: 0
BEP Service Dispatch Number 1: 0
BEP Service Dispatch Number 2: 0
BEP Service Dispatch Number 3: 0
BEP Service Dispatch Number 4: 0
```

Figure 8-150 Example of Backplane Text File with Hints



```
PWA Information
Product Name: Backplane
Design Owner Group: MKE
Part Number: 2260219
Functional Revision: G
Bar Code Serial Number: 000015
Date of Manufacture: 20011214
Power On Hours: 0
Fab Revision: ?
Date of Installation: YYYYMMDD
Service Defect Reference Number 1:
Service Defect Reference Number 2:
Service Defect Reference Number 3:
Service Defect Reference Number 4:
Service Defect Reference Number 5:
Service Dispatch Number: 0
Console Information
Console Part Number: 2188900-2
Console Serial Number: 57116US6
Console Date of Manufacture: YYYYMMDD
Console Power On Hours: 0
Back End Processor (BEP) Information
BEP Part Number: 2266548-3
BEP Functional Revision: ?
BEP Serial Number: ????????????????????
BEP Date of Manufacture: YYYYMMDD
BEP Power On Hours: 0
BEP Date of Installation: YYYYMMDD
BEP Base Image Software Version: 0.0.0
BEP Service Defect Reference Number 1: 0
BEP Service Defect Reference Number 2: 0
BEP Service Defect Reference Number 3: 0
BEP Service Defect Reference Number 4: 0
BEP Service Defect Reference Number 5: 0
BEP Service Dispatch Number 1: 0
BEP Service Dispatch Number 2: 0
BEP Service Dispatch Number 3: 0
BEP Service Dispatch Number 4: 0
```

Figure 8-151 Backplane Text File

8-35-3-4Modify VPD Text Files (cont'd)

NOTE: *The file defaults values will have ?????? in the bar code field, however this must be changed as only alpha-numberic characters are valid for this field when updating the bar code. Some boards may already have data present (no ??????). If this is the case simply verify the data present and correct if necessary.*

3.) Open the *.txt files for the Equalization Board and Backplane

4.) In each file:

NOTE: *All Bar Code and revision entries MUST be in all uppercase letters.*

* Verify the Product Name Field as the correct circuit board name. If blank enter the data from Table 8-9 on page 8-135.

* Verify that the Design Group is MKE. If blank enter MKE.

* Verify the Part Number Field as the correct circuit board part number. If blank enter the data from Table 8-9 on page 8-135.

* Enter the Functional Revision (PWA Label) of the board (Uppercase alpha character).

* Enter the Bar Code Serial Number of the board (minumum six character/alpha numeric digits).

* Enter the Date of Manufacture from the console rating plate: YYYYMMDD format 200_ _ _01(Only numeric characters are valid, so this field must be changed). The Day (DD) is always "01".

* Power On Hours can be left as is or enter "0" if it is blank.

* Enter the Fab Revision (PWB Label) of the board. Only alpha characters can be entered so convert any numbers to letters (0=A, 1=B, 2=C, 3=D, 4=E, 5=F, 6=G, etc...).

* Enter the Date of Installation from the console rating plate: YYYYMMDD format 200_ _ _01(Only numeric characters are valid, so this field must be changed). The Day (DD) is always "01".

The Backplane text file actually contains 3 sections.

- Backplane PWA Information
- Console Information
- Back End Processor (BEP) Information

NOTE: *If the Console Serial Number is not correct here, the customer options will NOT work.*

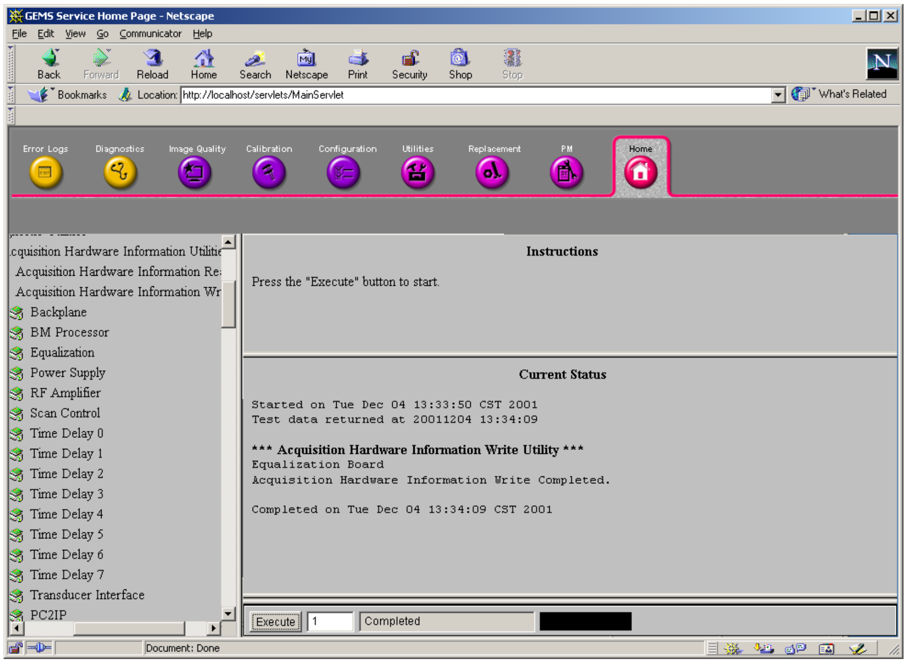
5.) After file changes have been made, SAVE and close all text files.

NOTE: *At this time, none of these fields are write protected.*

8-35-3-5 Acquisition Diagnostics - Write New VPD Data to EEPROM

Once the *.txt files have been updated with the appropriate information, go back to the Netscape Browser and navigate to the following menu location:

1.) Acquisition Diagnostics>Diagnostic Groups>Diagnostic Utilities>Acquisition Hardware Information Utilities>Acquisition Hardware Information Write Utilities.


GEMS Service Home Page - Netscape
File Edit View Go Communicator Help
Back Forward Reload Home Search Netscape Print Security Shop Stop
Bookmarks Location: http://localhost/servlets/MainServlet
What's Related
Error Logs Diagnostics Image Quality Calibration Configuration Utilities Replacement PM Home
cquisition Hardware Information Utilitie
Acquisition Hardware Information Re
Acquisition Hardware Information Wr
Backplane
BM Processor
Equalization
Power Supply
RF Amplifier
Scan Control
Time Delay 0
Time Delay 1
Time Delay 2
Time Delay 3
Time Delay 4
Time Delay 5
Time Delay 6
Time Delay 7
Transducer Interface
PC2IP
Execute
1
Completed
Document: Done

Instructions

Press the "Execute" button to start.

Current Status

```
Started on Tue Dec 04 13:33:50 CST 2001
Test data returned at 20011204 13:34:09

*** Acquisition Hardware Information Write Utility ***
Equalization Board
Acquisition Hardware Information Write Completed.

Completed on Tue Dec 04 13:34:09 CST 2001
```

Figure 8-152 Acquisition Hardware Information Write Utilities

2.) Separately select the Equalization circuit board and Backplane menu items to write the new information to the EEPROMs. You can check data by reading back the files as performed in Section 8-35-3-3 on page 8-138.

Section 8-36
Rear Caster Replacement Procedure

Select the movie camera icon to view the video of the Rear Caster adjustment procedures. This will illustrate a good way to elevate the scanner to replace the casters.

8-36-1 Manpower

1 person, 30 minutes (one caster)

8-36-2 Tools

#2 Phillips screwdriver

5mm Hexagon wrench

Bevel Edged Board and Wooden Wedge (both included in package with replacement Casters)

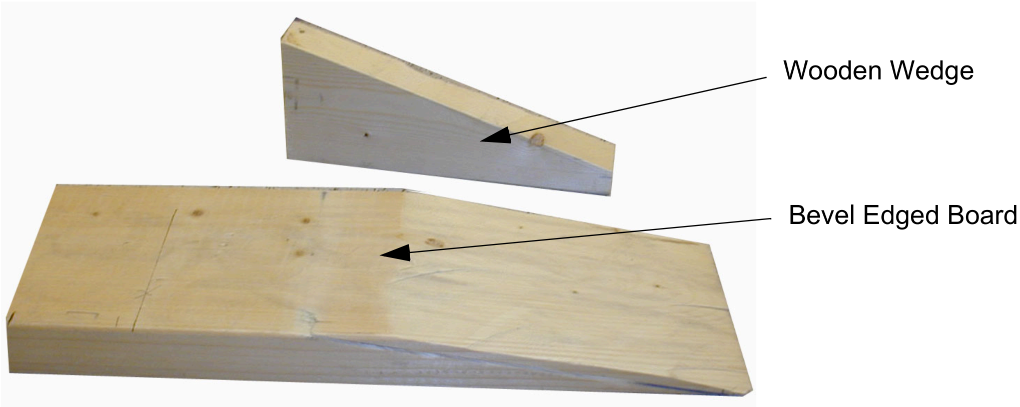


Figure 8-153 Bevel Edged Board and Wooden Wedge.

8-36-3 Preparations (click here to view the cover removal video)

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3.
2.) Remove Upper Rear Cover as described in Section 8-2-3 on page 8-7.
3.) Remove the Lower Rear Cover as described on Section 8-2-6 on page 8-10 and Section 8-2-3 on page 8-7.
4.) Remove the Side covers as described in Section 8-2-2 on page 8-5.

8-36-4 Rear Caster Removal Procedure

1.) Turn Front Casters as shown in Figure 8-154.
2.) Activate Direction Lock.
3.) Put the bevel-edged board on the floor.

⚠ **WARNING** ***Prior to elevating scanner, verify that the floating keyboard is locked in its lowest position.***

⚠ **WARNING** ***Use extreme caution as long as LOGIQ™ 9 is un-stable, not resting on all four Casters.***

4.) Pull the system backwards up the board incline. This will lift the Rear Wheel on the opposite side of the System from the floor.

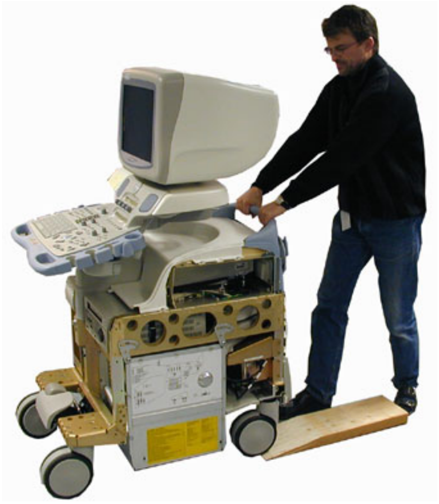


Figure 8-154 Pull system backwards up the board incline

5.) Activate the brakes on all Casters, except the one you intend to replace.
6.) Turn the Rear Caster that stands on the Bevel Edged Board in the direction as shown in Figure 8-155.

8-36-4 Rear Caster Removal Procedure (cont'd)

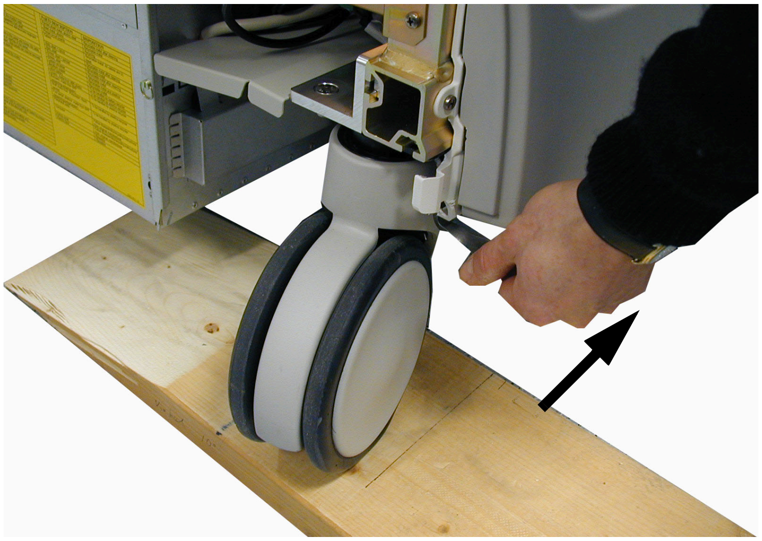


Figure 8-155 Activate Rear Brakes

7.) The system is now nearly balanced between one Front and one Rear Caster (illustrated in this Procedure; Left Front and Right Rear).

8.) Make the System rest on both Front Casters and lift the Rear Caster. Put the Wooden Wedge under the AC Transformer. This will stabilize the System with the Rear Caster free from the floor.

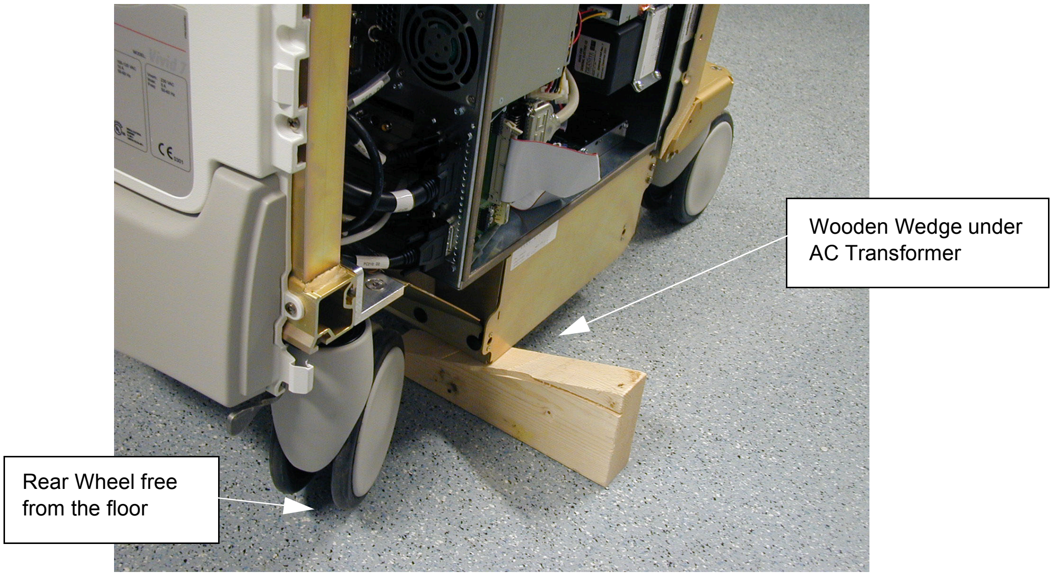

Wooden Wedge under AC Transformer
Rear Wheel free from the floor

Figure 8-156 System stabilized with rear Caster free from the floor

8-36-4 Rear Caster Removal Procedure (cont'd)

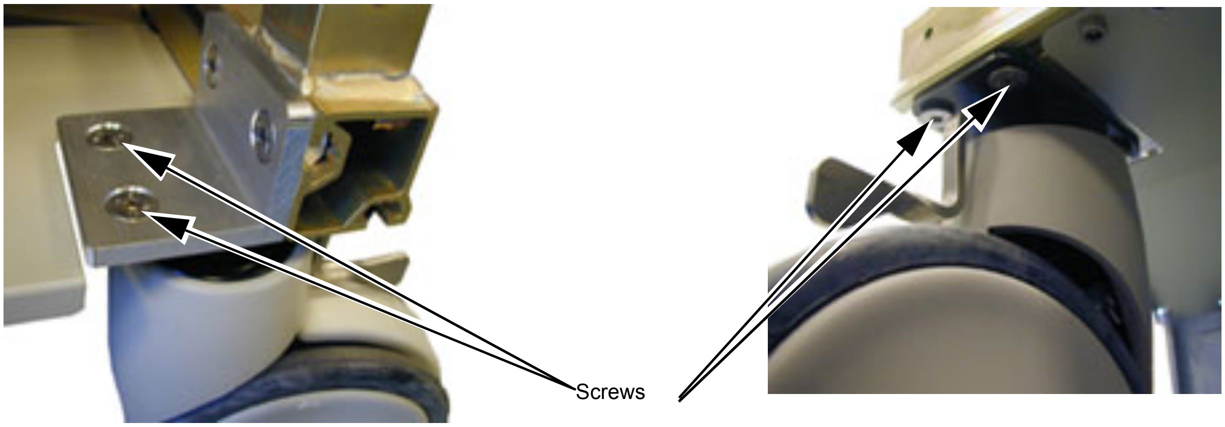


Figure 8-157 Rear Caster fastening

9.) Remove four (4x) screws fastening Caster.

10.) Remove Caster

8-36-5 Rear Caster Installation Procedure

1.) Replace the Caster and tightly fasten it with four (4x) screws.

⚠ **WARNING** ***Use extreme caution in the next two steps. The scanner is unstable.***

2.) Remove the Wooden Wedge.

3.) Roll the system off the Bevel Edged Board.

4.) To replace the other Rear Caster, repeat all the steps from Front Caster Replacement Procedure on page 8-151, but now using the Bevel Edged board and the Wooden Wedge on the other side of the system.

5.) Install the Upper Rear Cover as described in Section 8-2-3 on page 8-7.

6.) Install the Lower Rear Cover as described on Section 8-2-6 on page 8-10 and Section 8-2-3 on page 8-7.

7.) Install the Side Covers as described in Section 8-2-2 on page 8-5.

Section 8-37
Front Caster Replacement Procedure

8-37-1 Manpower

1 person, 30 minutes

8-37-2 Tools

Torx screwdriver T-20

Open End wrenches, 10 and 134 mm

5 mm hexagon key

Bevel Edged Board and Wooden Wedge (included in package with replacement Casters)

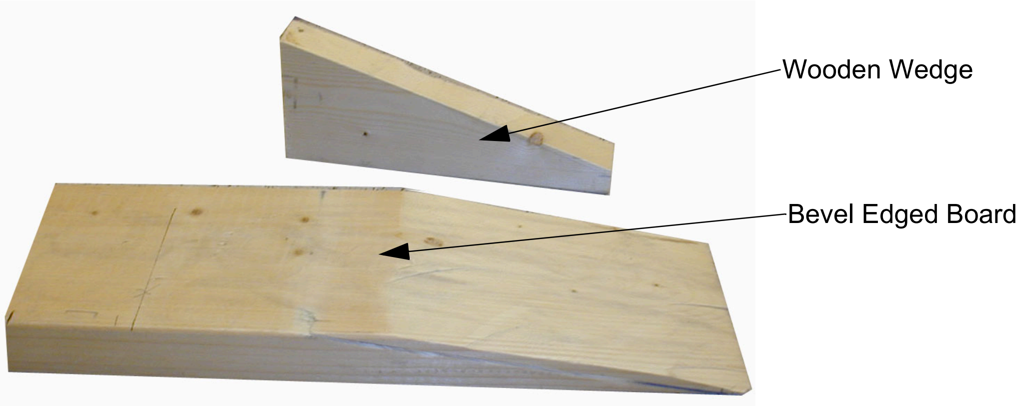


Figure 8-158 Bevel Edged Board and Wooden Wedge.

8-37-3 Preparations

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3.
2.) Remove the Front Bumper as described on Section 8-2-7 on page 8-11.
3.) Turn Front Casters as shown in Figure 8-159.
4.) Activate Direction Lock.
5.) Put the Bevel Edged Board on the floor.

⚠ **WARNING** ***Prior to elevating scanner, verify that the floating keyboard is locked in its lowest position.***

⚠ **WARNING** ***Use extreme caution as long as VIVID 7 is un-stable, not resting on all four Casters.***

6.) Pull the system backwards up the board incline.

8-37-3 Preparations (cont'd)

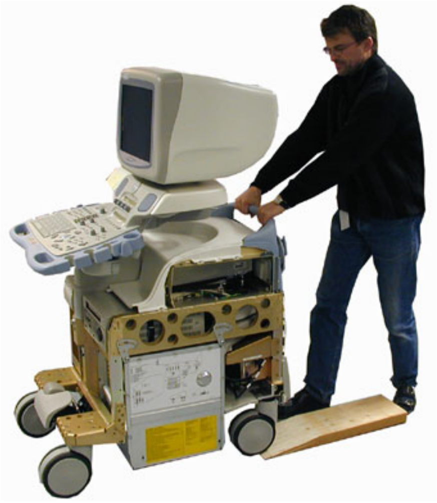


Figure 8-159 Pull system backwards up the board incline

7.) Turn the Rear Caster on the board in the direction as shown in Figure 8-160.

8.) Activate both Rear Brakes as shown in Figure 8-160.

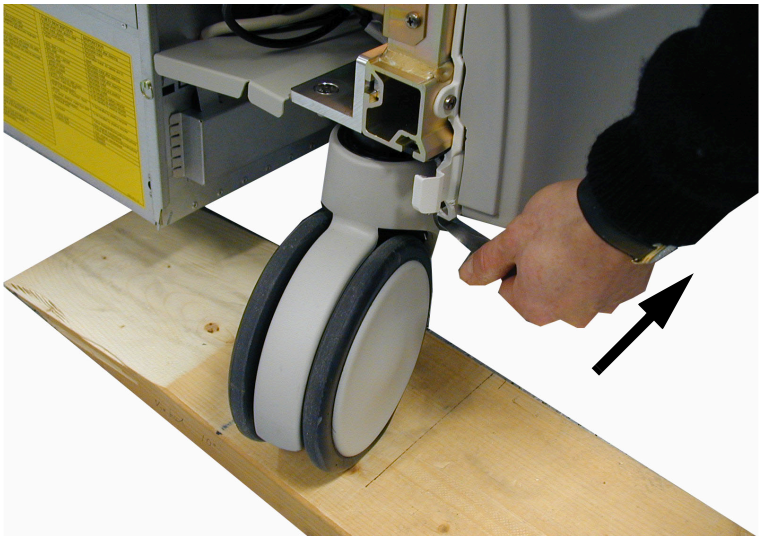


Figure 8-160 Activate both rear brakes

8-37-3 Preparations (cont'd)

9.) Put the Wooden Wedge under the Card Rack. This will stabilize the System with the right Front Wheel free from the floor.

.

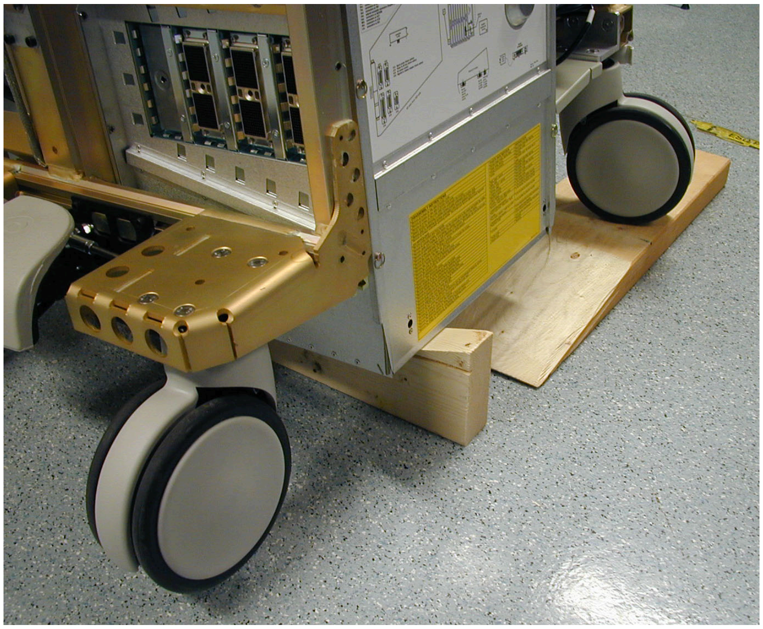


Figure 8-161 System stabilized with front wheel free from the floor

8-37-4 Front Caster Removal Procedure

10.)Remove the lock pin that secures the balljoint.

11.)Pull balljoint apart.

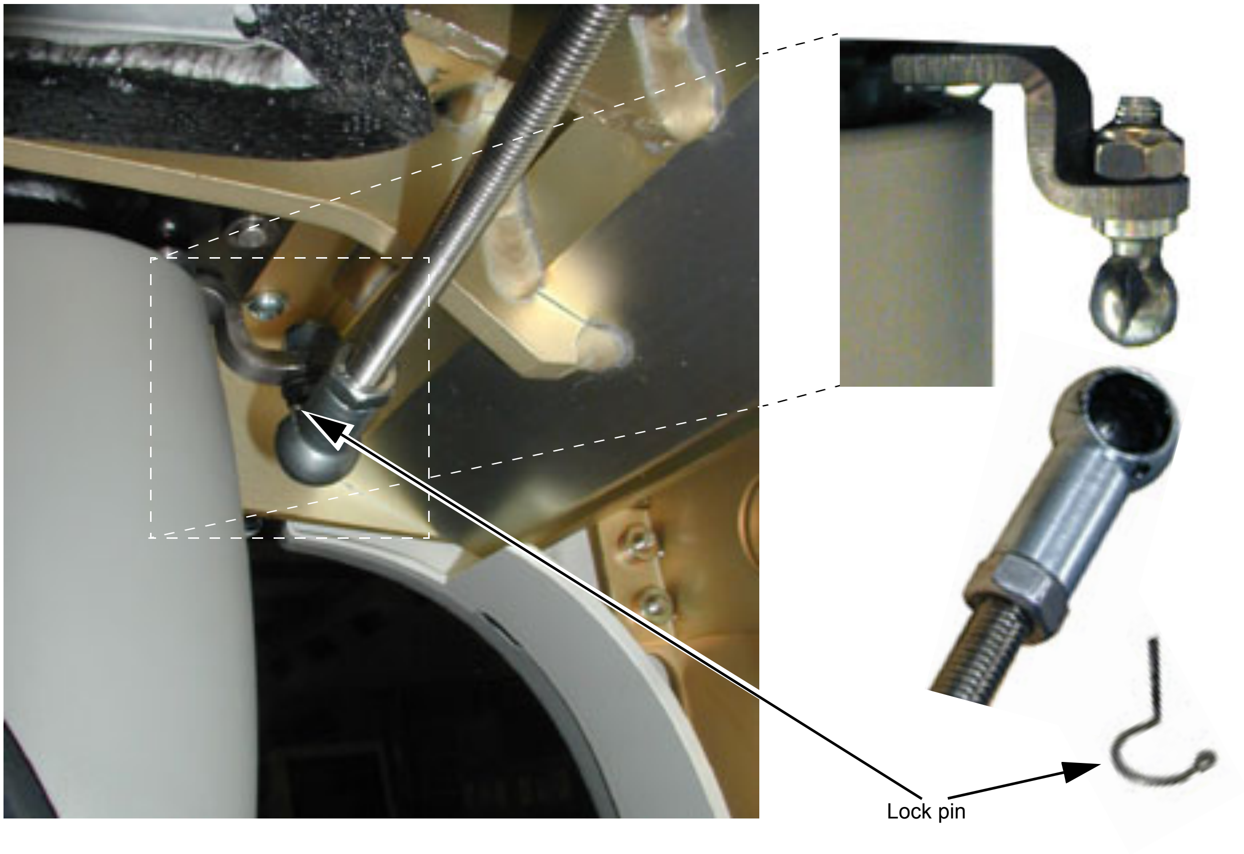


Figure 8-162 Front Caster Ball Joint

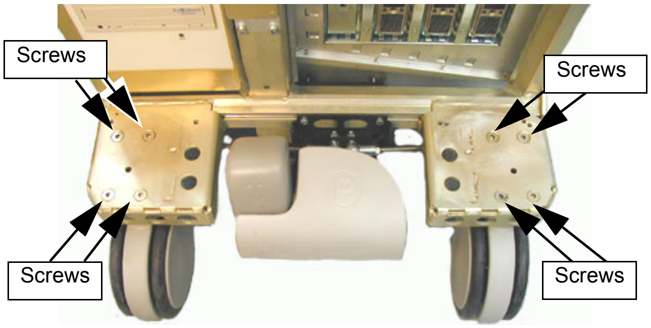


Figure 8-163 Caster fastening (both Casters shown)

12.)Unscrew four (4x) screws.

13.)Remove the Caster.

8-37-5 Front Caster Installation Procedure

1.) Move the ball piece of the joint from old Caster to new Caster (See Figure 8-162).

2.) Align new Caster on the frame and fasten it tightly with four (4x) hexagon screws.

3.) Press the balljoint together and install the lock pin (See Figure 8-162).

4.) To replace the other Front Caster, repeat all the steps from Front Caster Replacement Procedure on page 8-151, but now using the Bevel Edged board and the Wooden Wedge on the other side of the system.

5.) Install Bumper and Covers as described in Front Bumper Installation Procedure on page 8-11.

6.) Roll the system off the Bevel Edged Board.

8-37-6 Adjustment

1.) Align front bumper with side bumpers before tighten nuts.

Section 8-38
Brake/Direction Lock Assembly Replacement Procedure

8-38-1 Manpower

One person, 1 hour.

8-38-2 Tools

- Phillips screwdriver size 2
- Hexagon key 5 mm
- Torx screwdriver T-20
- Wrench 11 and 13 mm

8-38-3 Preparations (click here to view the cover removal video)

1.) Remove Front Bumper.
2.) Remove footrests on both pedals by unscrewing 4 Torx screws on each.

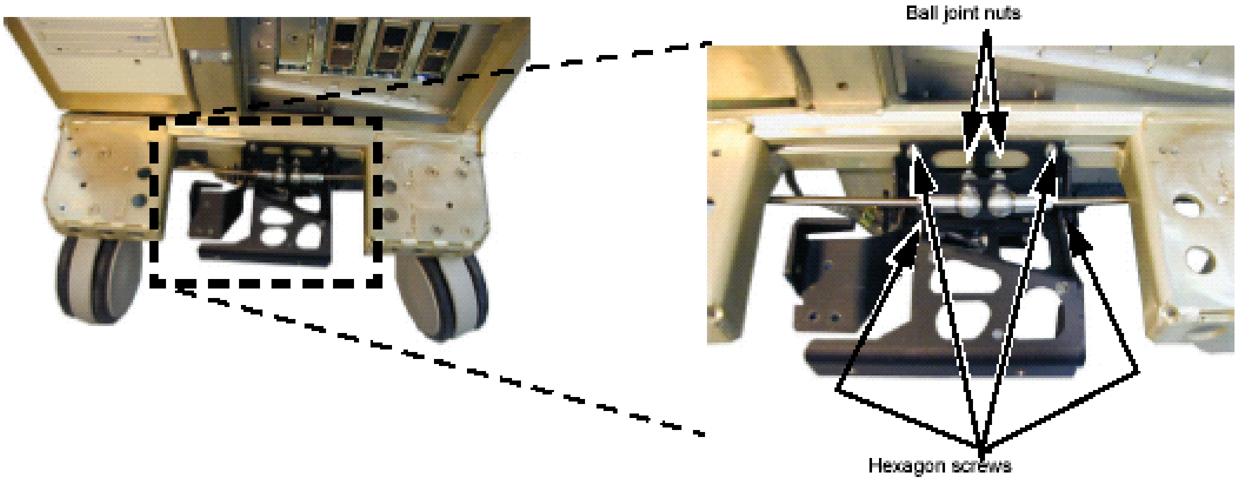


Figure 8-164 Brake Assembly

8-38-4 Brake pedal and Direction Lock Removal Procedure

1.) Unscrew 2 nuts on the two ball joints on the brake rods, located over the middle of brake assembly.
2.) Unscrew the 4 hexagon screws. Two of them located under the Brake Assembly.

NOTE: The nuts may slide out of position.

3.) Remove the Brake Pedal and Direction Lock Assembly.

8-38-5 Brake pedal and Direction Lock Installation procedure

1.) Put the Brake Pedal and Direction Lock Assembly in position and fasten the 4 hexagon screws loosely in the sliding nuts.
2.) Fasten the ball joint nuts before tightening the 4 hexagon screws.
3.) Install Front Bumper .
4.) Fasten footrests to Brake Pedal and Direction Lock Assembly. Fasten the screws gently.

Section 8-39
Brake Pedal Replacement Procedure

8-39-1 Manpower

One person, 15 minutes

8-39-2 Tools

Torx screwdriver T-20

8-39-3 Brake Pedal Replacement Procedure

1.) Unscrew 4 screws under the pedal.
2.) Replace the pedal with a new one.
3.) Fasten 4 screws.

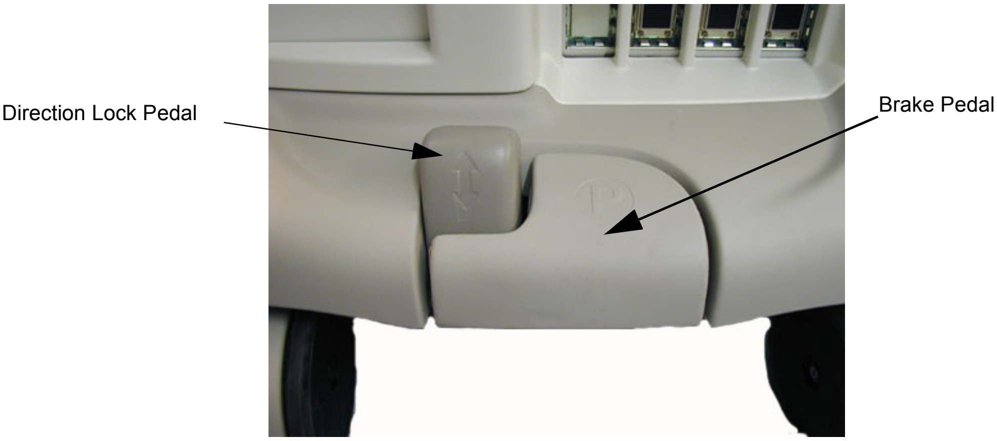


Figure 8-165 Brake Pedal

Section 8-40
Direction Lock Pedal Replacement Procedure

8-40-1 Manpower

One person, 15 minutes

8-40-2 Tools

Torx screwdriver T-20

8-40-3 Direction Lock Replacement Procedure

1.) Unscrew 4 screws, 3 under and 1 at the left side of the pedal.
2.) Replace the pedal with a new one.
3.) Fasten 4 screws.

Section 8-41
Frogleg Replacement Procedure

8-41-1 Manpower

2 persons, 3 hours

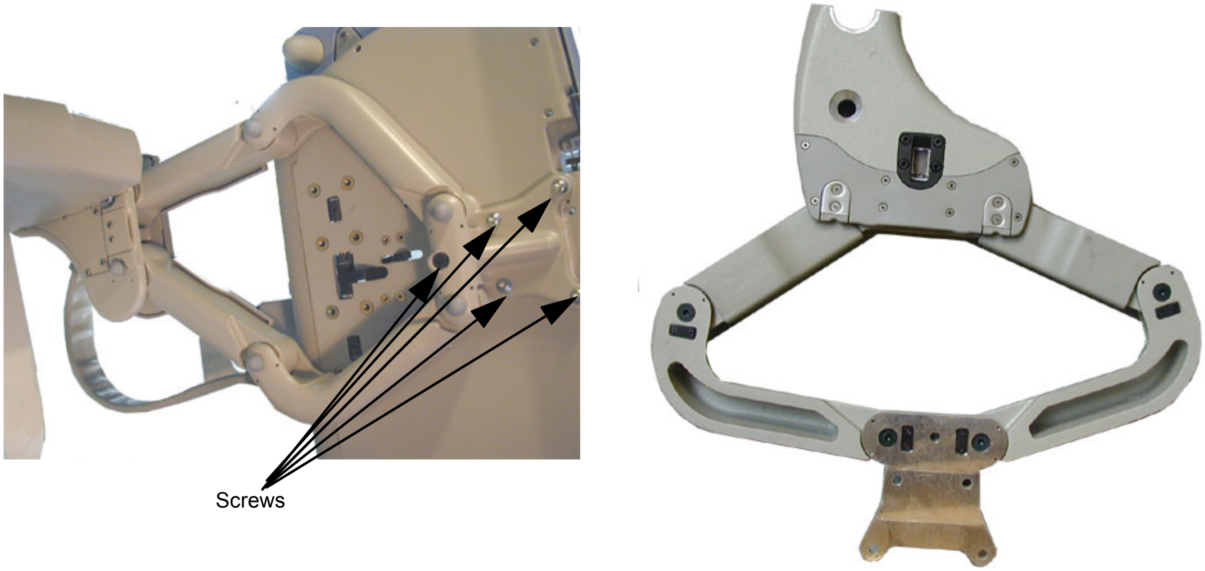
8-41-2 Tools

- Hexagon key, 10 mm, with torque/momentum controller
- Hexagon keys, 4, 5 and 6 mm
- Phillips screwdriver, size 2 and 3

8-41-3 Preparations

1.) Shut down the system as described in Power Off / Shutdown on page 4-3.
2.) Move Top Console to down position.
3.) Remove monitor as described in Monitor Assembly Replacement Procedure on page 8-92.
4.) Unscrew two (2) hexagon screws to loosen the Console Cable Neck from the Frogleg.
5.) Unscrew four (4) screws on the Upper Column Cover.

8-41-4 Frogleg Removal Procedure



Frogleg removed

Figure 8-166 Frogleg

1.) Put a piece of strong paperboard or carpet on top of Top Cower (to put Top Console Assembly on).
2.) Unscrew five (5) hexagon screws (5 and 6 mm) to loosen the Top Console from the front end of the Frogleg. Lift the still attached console assembly carefully from the Frogleg. Turn it backwards and put it on the paperboard. Make sure it lays stabile.
3.) Unscrew the 10 mm hexagon bolt on Frogleg.

4.) Lift Frogleg off its cone axle.

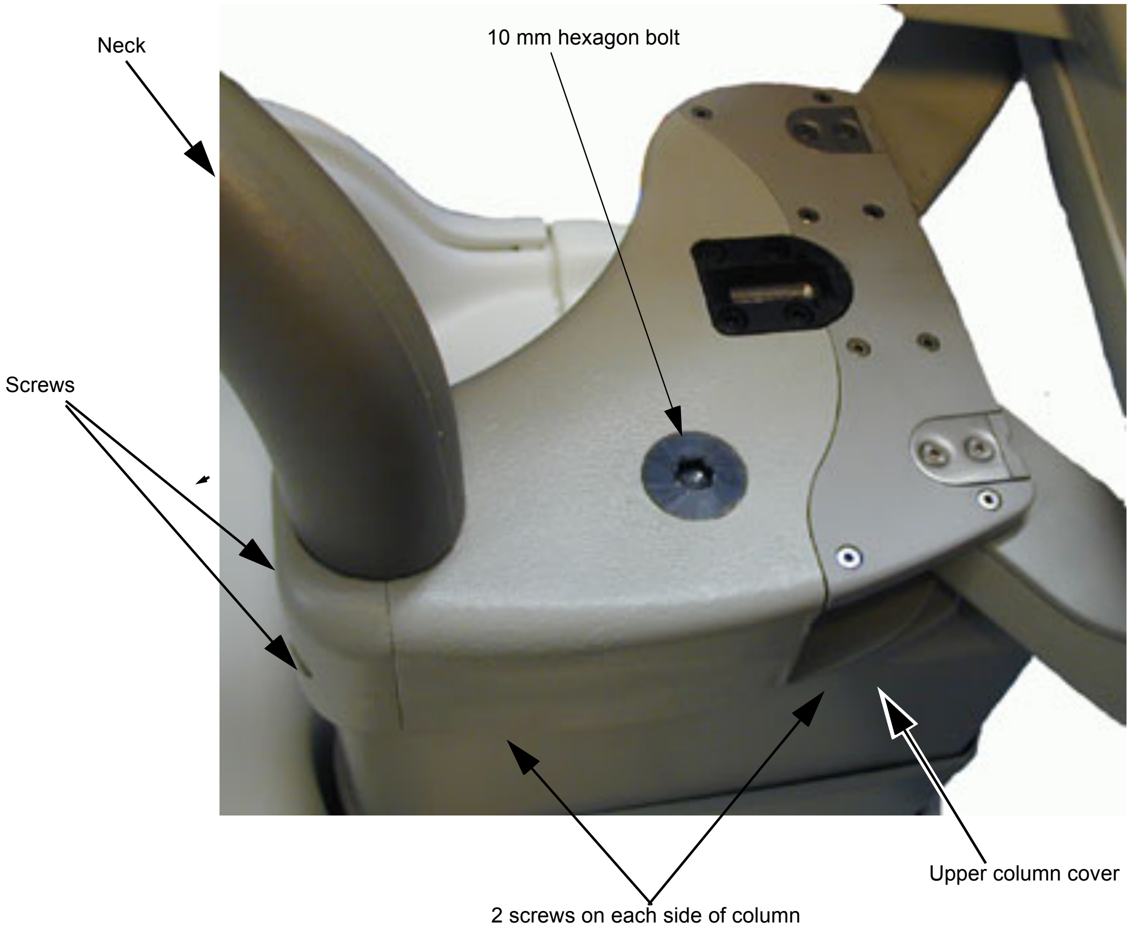


Figure 8-167 Frogleg base

8-41-5 Frogleg Installation Procedure

1.) Install a new Frogleg on the axle. Make sure its position forward is correct.
2.) Tighten the hexagon bolt with a momentum of 250 Newton.
3.) Fasten 4 screws on the Upper Column Cover.
4.) Reinstall the Top Console Assembly.
5.) Install the cable neck on the Froglegs back.
6.) Install Monitor as described in Monitor Replacement on page 8-94.

Section 8-42
Left and Right Frogleg Bumper Replacement Procedure

8-42-1 Manpower

One person 30 minutes

8-42-2 Tools

No special tool are needed

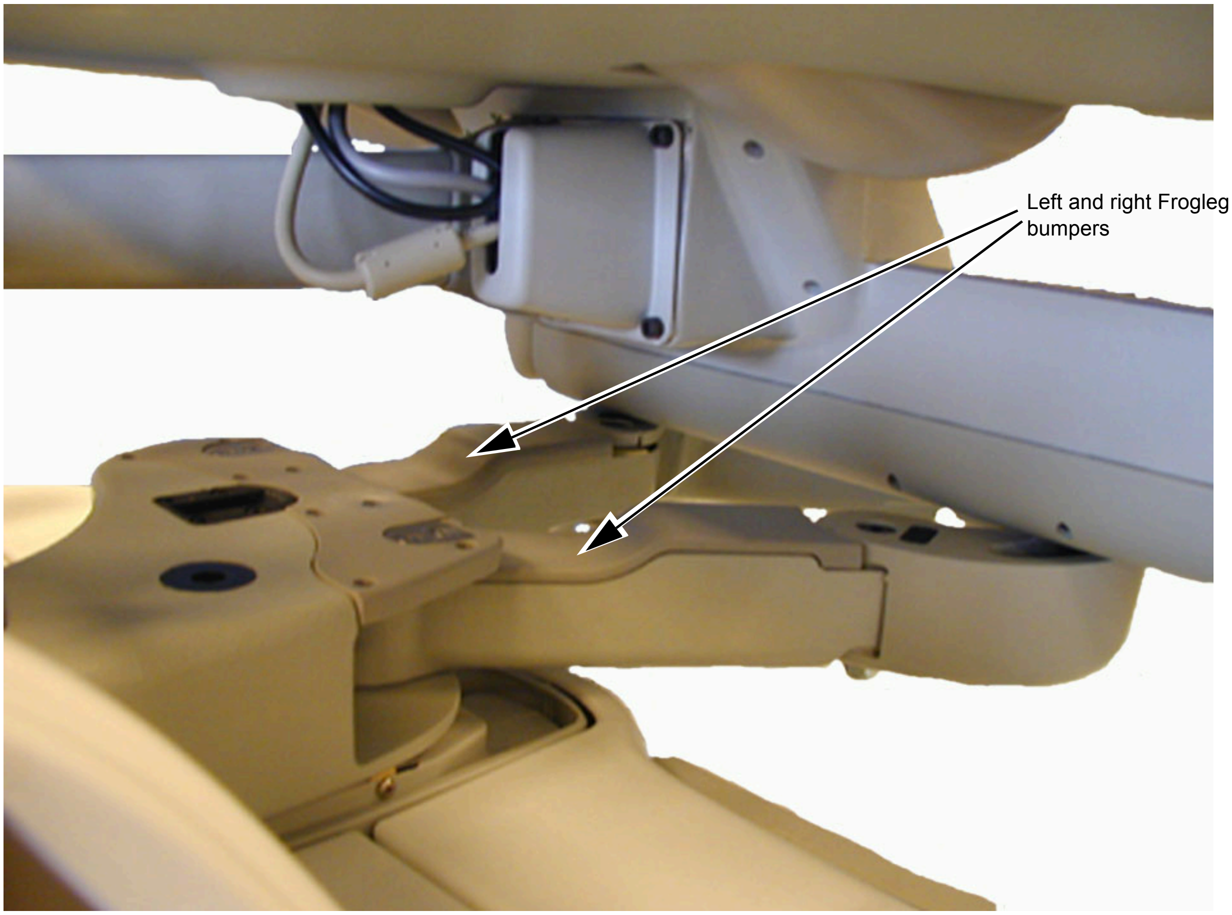


Figure 8-168 Left and Right Frogleg Bumpers

8-42-3 Left and Right Frogleg Bumper Replacement Procedure

1.) Move Top Console to front position.
2.) Tear off bumpers.

⚠ **CAUTION** **Be aware of the risk of squeezing fingers in Frogleg Assembly**

3.) Remove old glue from the Frogleg.
4.) Install new bumpers. Use glue adhesive to paint and rubber (Araldite 2026).

Section 8-43
Rear Crash Bumper Replacement Procedure

8-43-1 Manpower

One person, 30 minutes

8-43-2 Tools

No special tool are needed

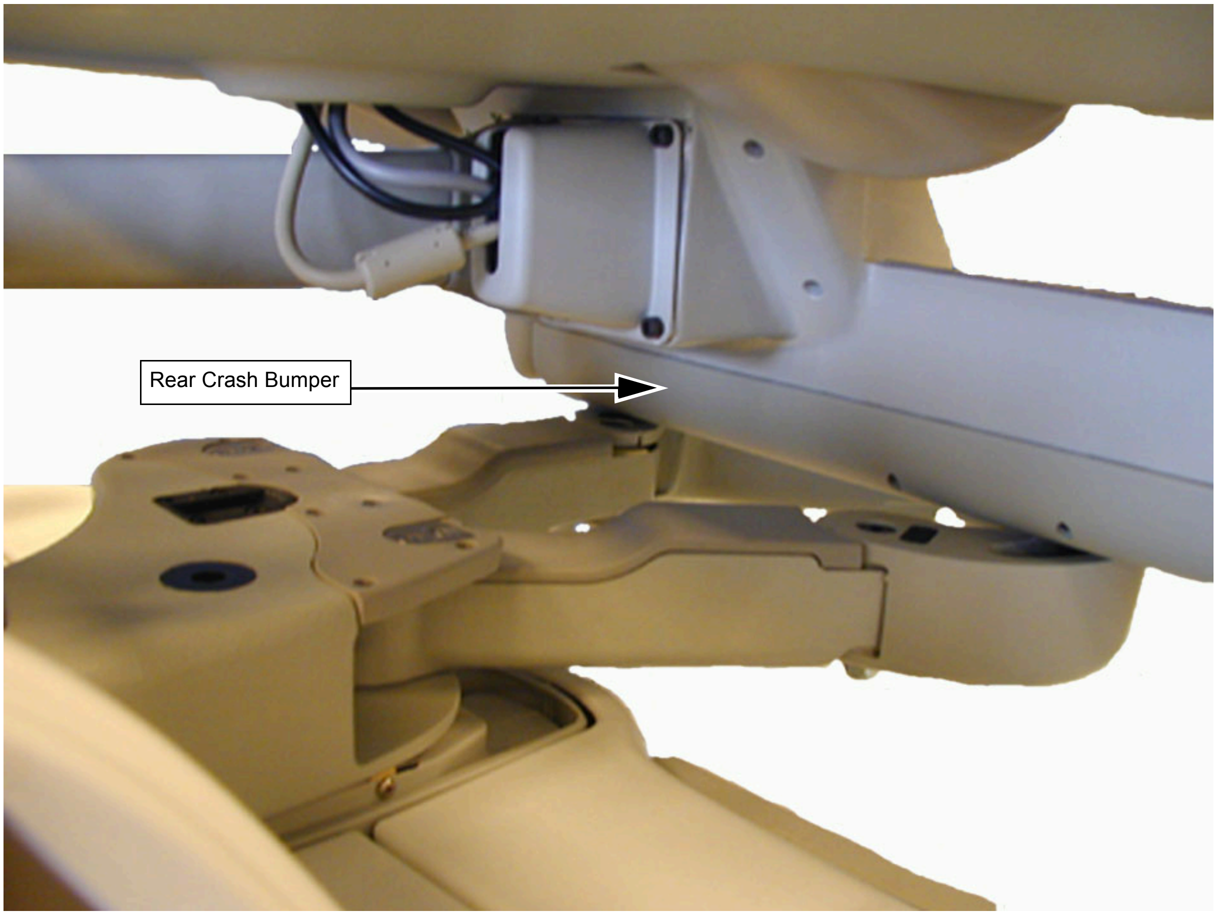


Figure 8-169 Bumper Crash Rear

8-43-3 Rear Crash Bumper Replacement Procedure

⚠ **CAUTION** **Be aware of the risk of squeezing fingers in Frogleg Assembly.**

1.) Tear off the bumper.Be aware of the risk of squeezing fingers in Frogleg Assembly.
2.) Remove old glue from the console.
3.) Install new bumper. Use glue adhesive to paint and rubber (Araldite 2026).

Section 8-44
Inner Boss Bumper Removal Procedure

8-44-1 Manpower

8-44-2 Tools

Hexagon key 2,5 mm

8-44-3 Inner Boss Bumper Replacement Procedure

1.) Move Top Console in front position.

⚠ **CAUTION** **Be aware of the risk of squeezing fingers in Frogleg Assembly.**

2.) Unscrew 8 hexagon screws.

3.) Replace the bumper.

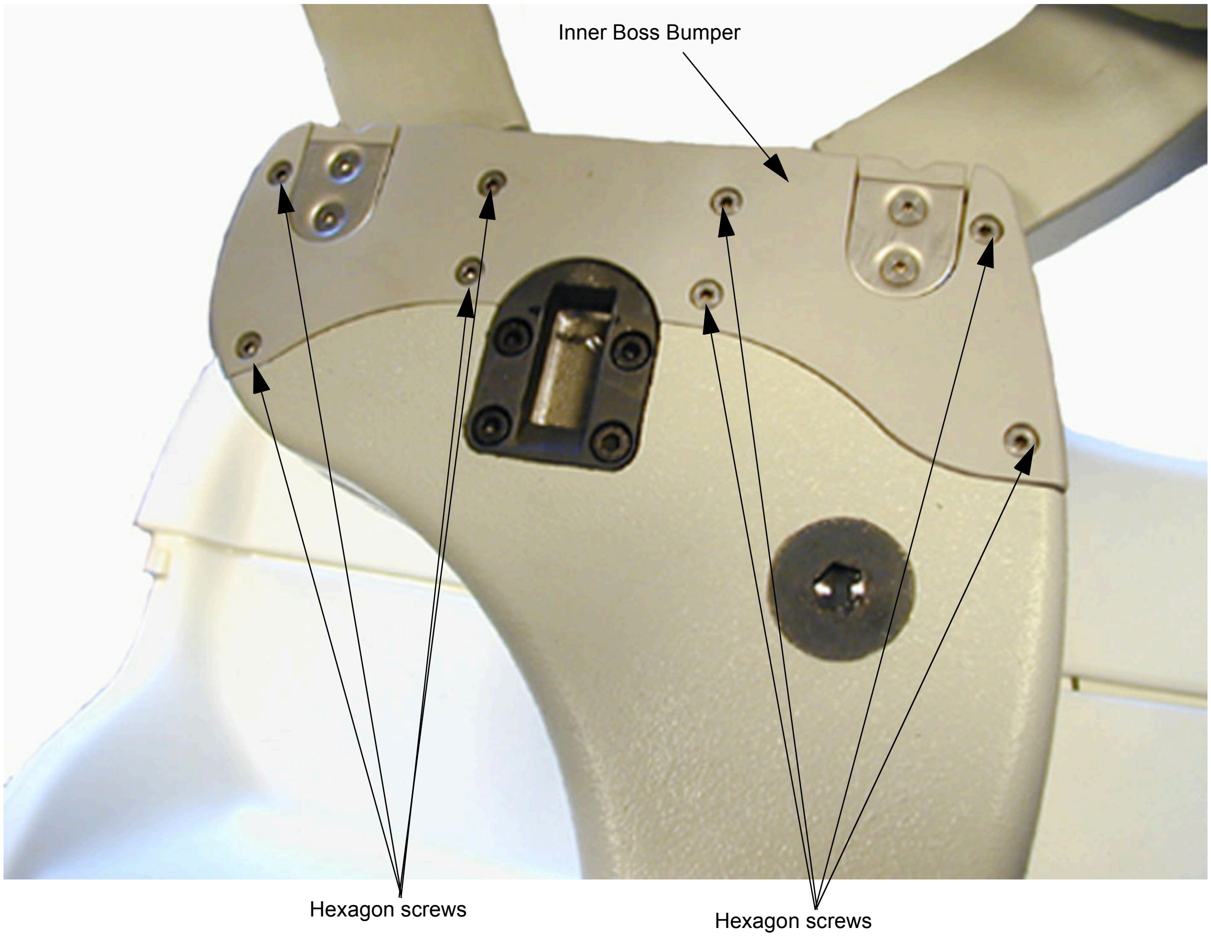


Figure 8-170 Frogleg base

Section 8-45
Inner Boss Crash Bumper Replacement Procedure

8-45-1 Manpower

8-45-2 Tools

Hexagon key 2,5 mm

8-45-3 Inner Boss Crash Bumper Replacement Procedure

1.) Move Top Console in front.

CAUTION **Be aware of the risk of squeezing fingers in Frogleg Assembly.**

2.) Unscrew 4 hexagon screws.
3.) Remove Bumper brackets.
4.) Replace the bumpers.

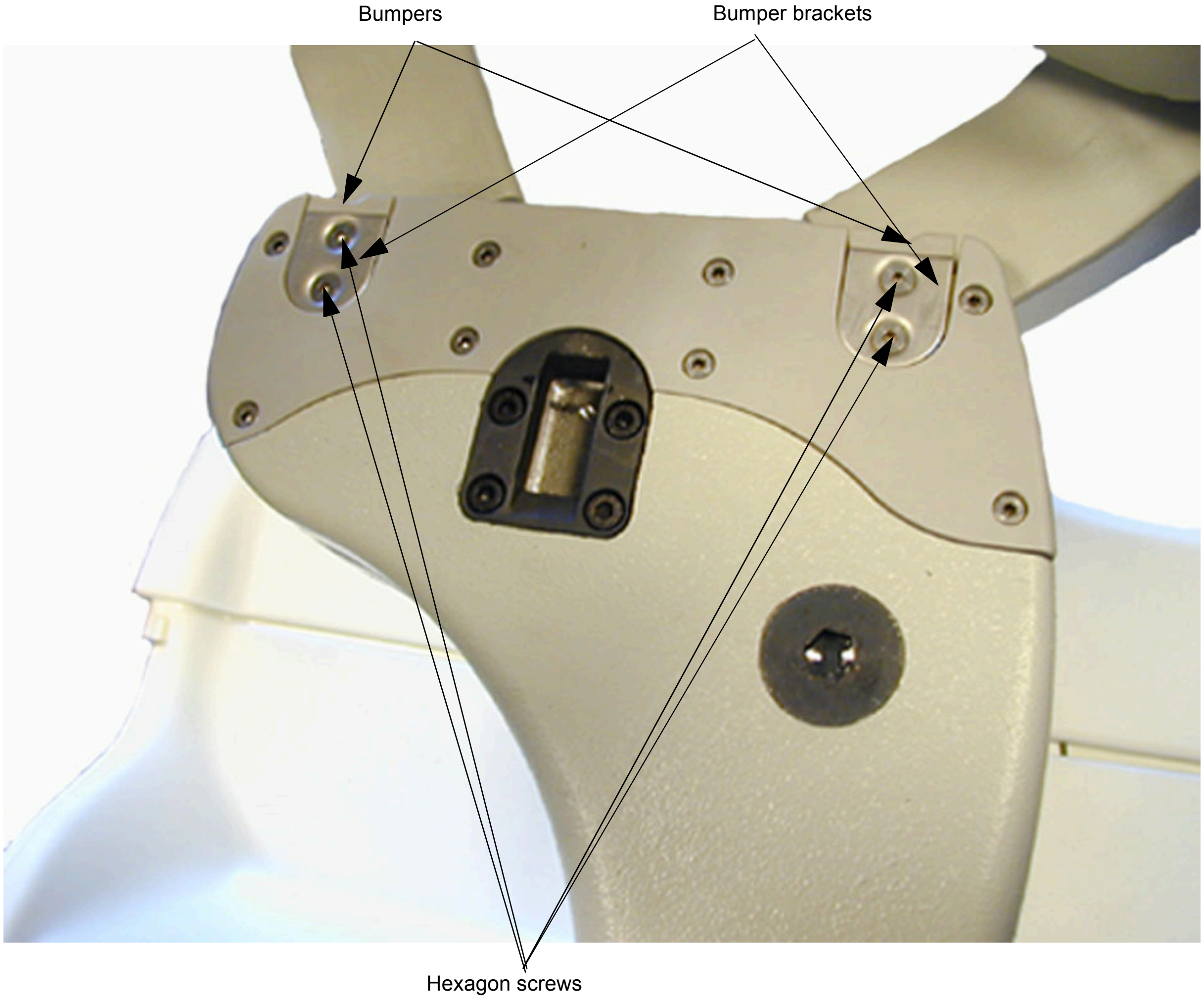


Figure 8-171 Frogleg base

Section 8-46
Upper and Lower Column Cover Replacement Procedure

8-46-1 Manpower

2 persons, 3 hours

8-46-2 Tools

- Hexagon key, 10 mm, with torque/momentum controller
- Hexagon keys, 4,5 and 6 mm
- Phillips screwdriver, size 1 and 3

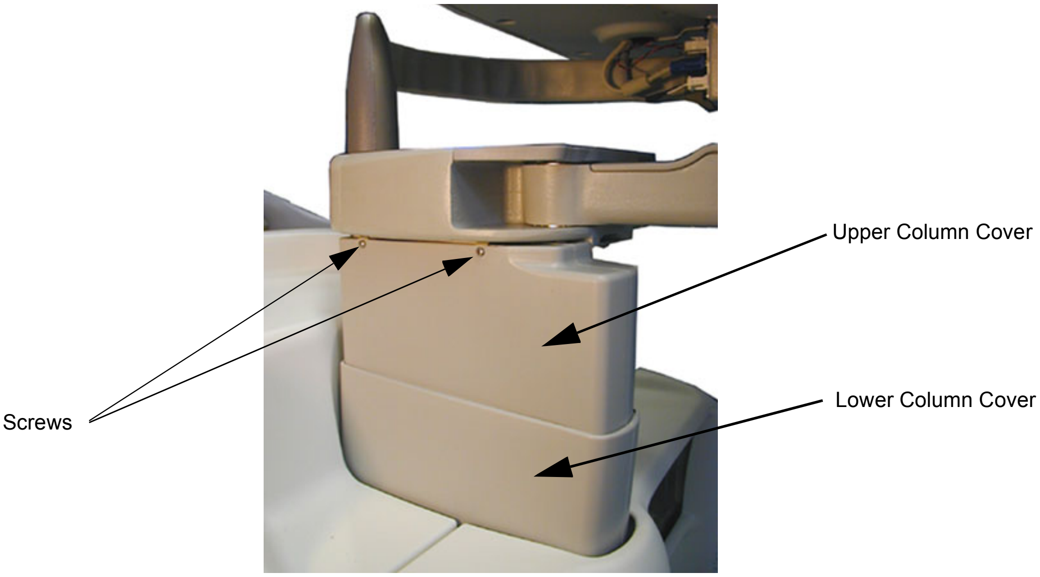


Figure 8-172 Upper and Lower Column Cover

8-46-3 Preparations

1.) Shut down the system as described in Power Off / Shutdown on page 4-3.
2.) Move Top Console to down position.
3.) Unscrew 4 screws on the Upper Column Cover.
4.) Remove monitor as described in Monitor Assembly Replacement Procedure on page 8-92.
5.) Remove Frogleg as described in Frogleg Replacement Procedure on page 8-159.

8-46-4 Upper and Lower Column Cover Removal Procedure

1.) Unscrew 2 Phillips screws on each side of Upper Column Cover.
2.) Lift Frogleg off its axle.
3.) Remove column covers.

8-46-5 Upper and Lower Column Cover Installation Procedure

1.) Thread on replacement cover(s) in correct order.
2.) Install Frogleg described in Frogleg Installation Procedure on page 8-161.
3.) Fasten 4 screws on Upper Column Cover.
4.) Install Monitor as described in Monitor Replacement on page 8-94.

Section 8-47
Color Video Printer Replacement Procedure

Click on the movie camera icon to view the video illustrating the removal and replacement of the color printer.

2 minutes and 9 seconds

8-47-1 Manpower

One person, 0,5 hour + travel.

8-47-2 Tools

Long Phillips driver.

8-47-3 Preparations

(click here to view the cover removal video)

Before replacing the UP-D21MD printer:

- Go to Utility > Peripherals > Printers
- Left click on the printer icon and delete the appropriate icon.

NOTE: Do not delete the UP-D50 icon.

- After deleting the icons, power-off the system and replace the printer.
- Power up the system and the printer will work.

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3.
2.) Remove the Left and Right Side Covers as shown on Section 8-2-2 on page 8-5.
3.) Remove the Front Cover as described on Section 8-2-5 on page 8-9.

8-47-4 Removal Procedure

1.) Disconnect the cables at the rear of the Video Printer. (RGB & Sync, S-Video, Remote and Power)
2.) Loosen the two straps that hold the printer. Remove the printer from the system

8-47-5 Mounting Procedure

1.) Slide the new printer in place and connect up the cables.
2.) Position the printer and fasten the two straps to secure it in place.
3.) Boot up and test the system.
4.) Ensure that the print keys still function as they did before.
5.) Replace the covers. (click here to view the cover installation video)

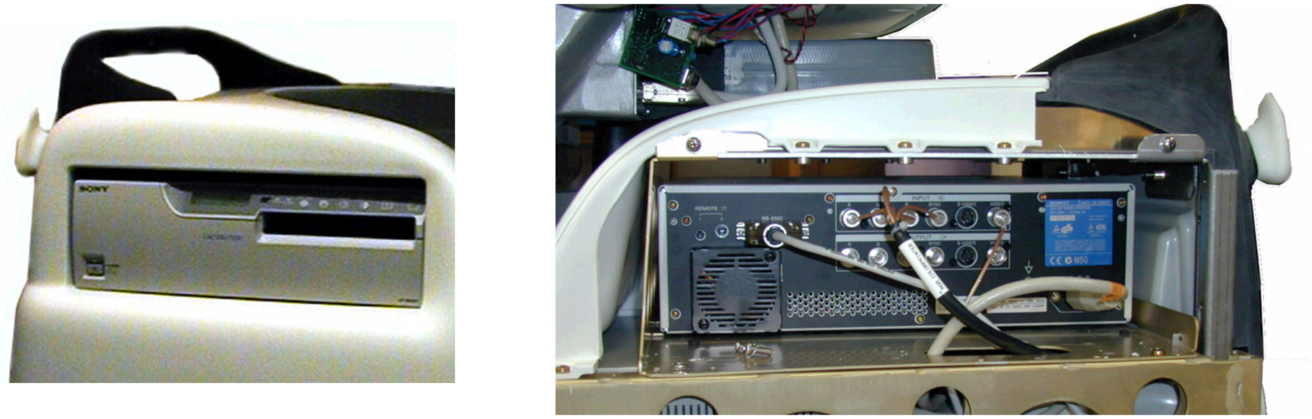


Figure 8-173 Front and Rear view of Color Video Printer in System

8-47-6 Differences in Replacing the Digital Color Printers

The major differences in the replacement of the Digital Color Printers is the rear panel cabling.

For the Sony UPD-50 there is the power cable, USB cable from USB#5 (C20) and the USB to SCSI Adapter.

Dip switches on the back of the UPD-50 are for SCSI termintaion and SCSI ID.

- SCSI termination is set to ON
- SCSI ID should be set to OFF/OFF/ON (SCSI ID #1). SCSI ID can be set to almost any number. Typically you avoid SCSI ID 0 which is usually the SCSI Controller.

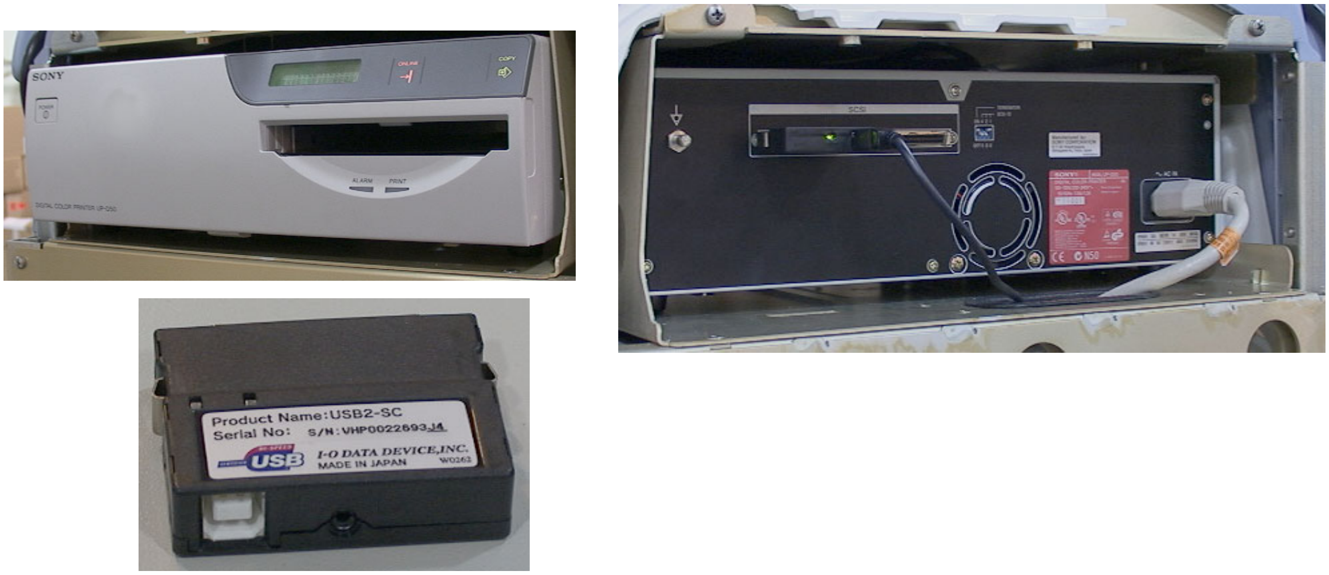


Figure 8-174 Sony UP-D50 Digital Color Printer

The smaller Sony UPD-21 has only Power and the USB connection from USB#5 (C20).

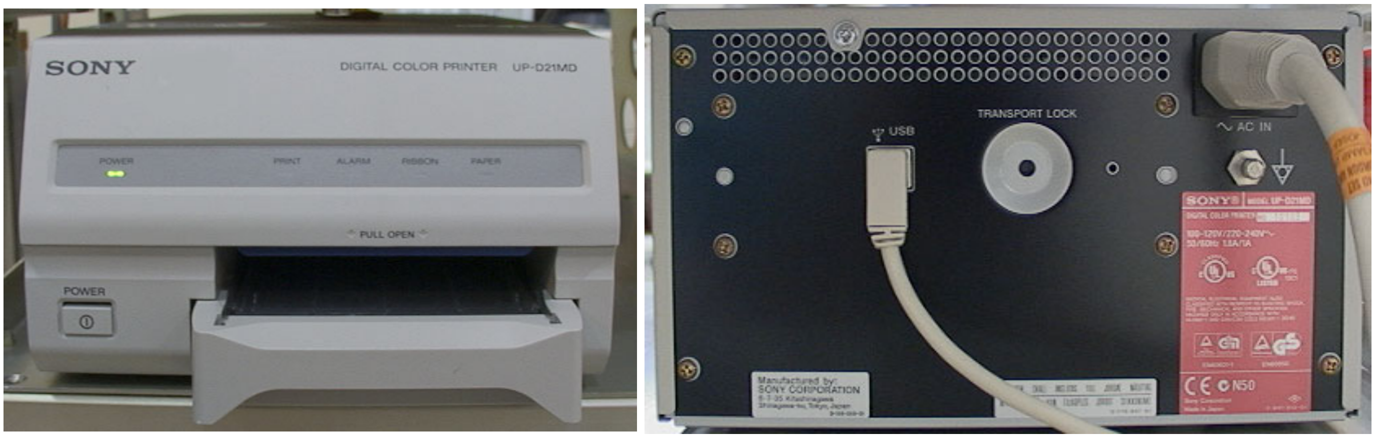


Figure 8-175 Sony UP-D21 Digital Color Printer

8-47-6 Differences in Replacing the Digital Color Printers (cont'd)

1.) To remove the Sony UP-D21, unfasten the two screws in the Cover Box and lift it out of the top of the system.

2.) Unfasten the Lock Latch and slide the UP-D21 assembly out the left side of the system.

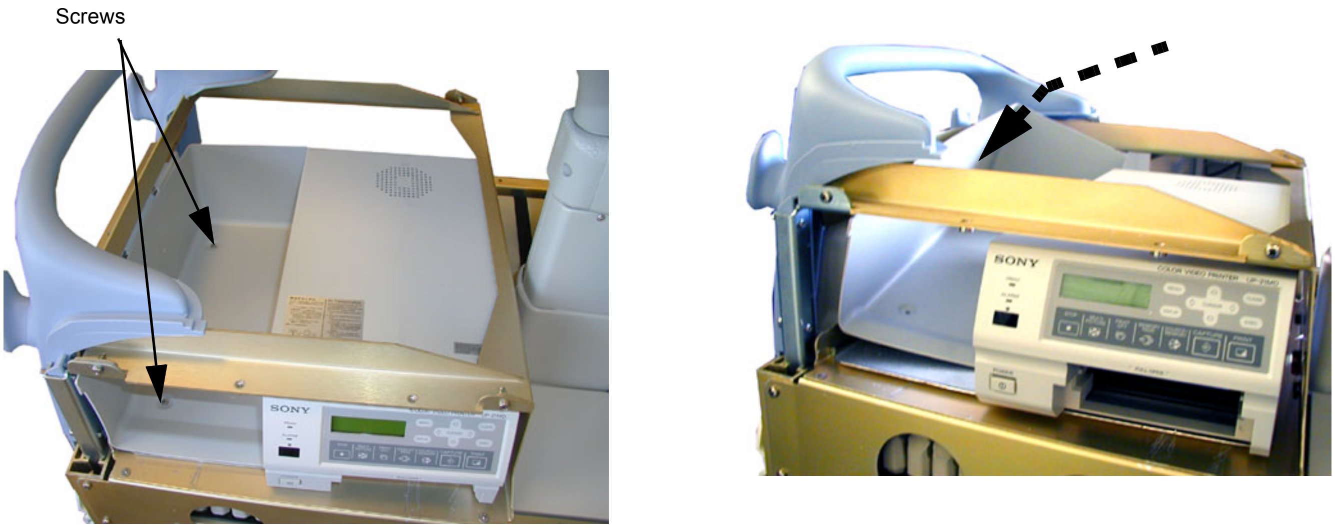


Figure 8-176 Cover Box

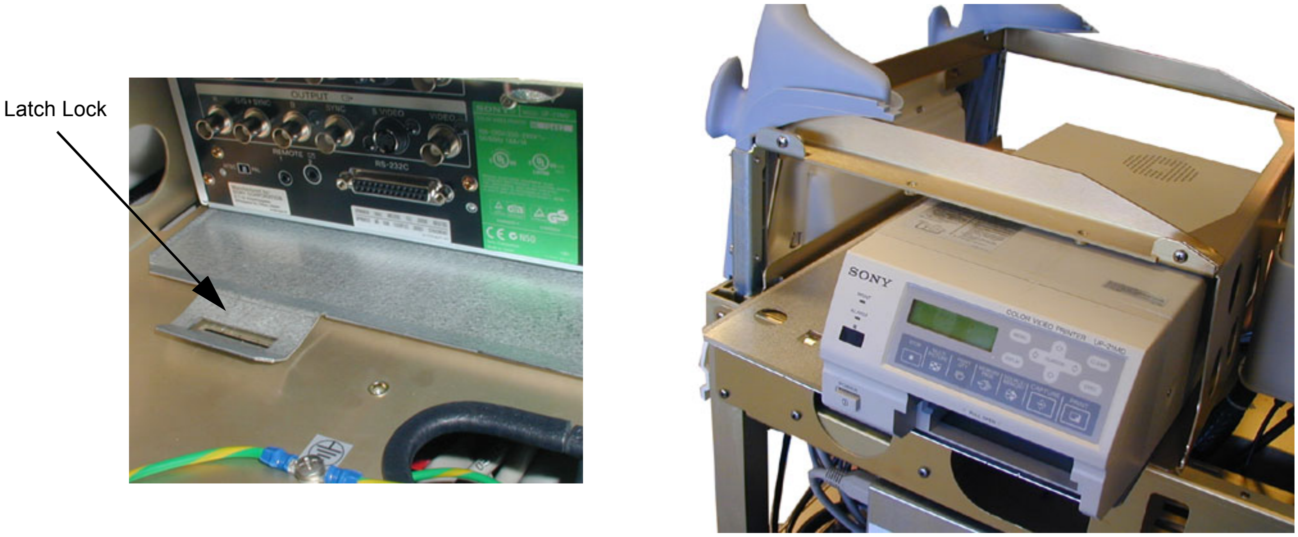


Figure 8-177 Printer Assembly

3.) Turn the Color Video Printer upside down.

4.) Detach the printer from the mounting plate loosening the four (4) screws supplied as shown in Figure 4-2.

8-47-6 Differences in Replacing the Digital Color Printers (cont'd)

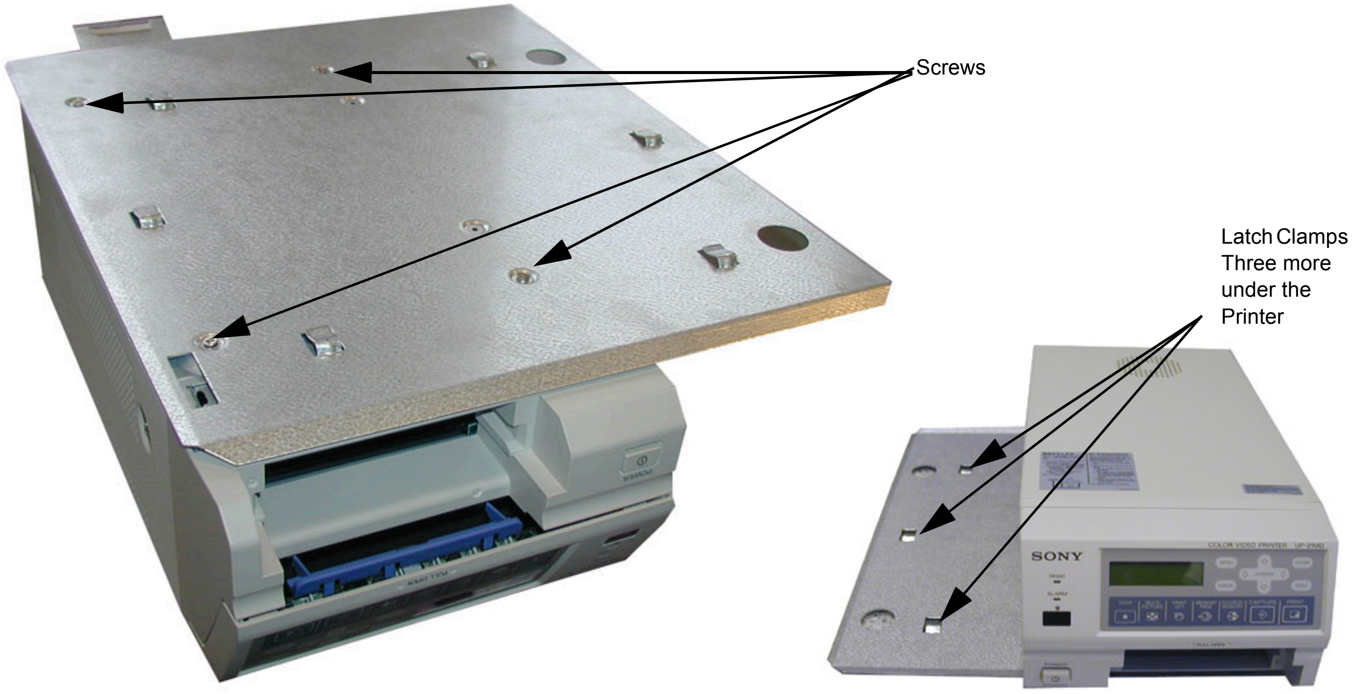


Figure 8-178 Sony UP-D21MD Mounting Plate

8-47-7 UP-D21 Installation Procedure

1.) Install the mounting plate on the new printer.
2.) On the left side of the System: Slide the UP-D21MD Printer Assembly into the color printer opening.
3.) The Mounting Plate has six Latch Clamps under and one Latch Lock at the rear end. These fit in square holes in the system's frame and locks the UP-D21MD when it's pushed in position.
4.) Install the Cover Box and secure with two (2) screws shown in Figure 4-4.

Section 8-48
Black and White Video Printer Replacement Procedure

Click on the movie camera icon to view the video illustrating the removal and replacement of the black and whiter printer.

2 minutes and 1 second

8-48-1 Manpower

One person, 30 minutes

8-48-2 Tools

No special tools needed

8-48-3 Preparations

(click here to view the cover removal video)

Before replacing the UP-D895MD printer:

- Go to Utility > Peripherals > Printers
- Left click on the printer icon and delete the appropriate icon.

NOTE: *Do not delete the UP-D50 icon.*

- After deleting the icons, power-off the system and replace the printer.
- Power up the system and the printer will work.

1.) Shut down the system as described in Power Off / Shutdown on page 4-3.

2.) Remove Left Side Cover as described in Side Covers (with Bumper) Replacement Procedure on page 8-5.

NOTE: *If more working room is desired, remove the right side, filter, top and front covers for improved access.*

8-48-4 Black and White Video Printer Removal procedure

1.) Loosen the strap that holds the printer in place.

2.) Disconnect the cables at the rear of the Video Printer and remove it from the system.

8-48-5 Black and White Video Printer Installation Procedure

1.) Replace printer and connect cables.
2.) Fasten the strap to secure the printer.
3.) Install Left Side Cover as described in Side Covers (with Bumper) Replacement Procedure on page 8-5. (click here to view the cover installation video)
4.) Boot up and test the system.
5.) Ensure that the print keys still function as they did before.

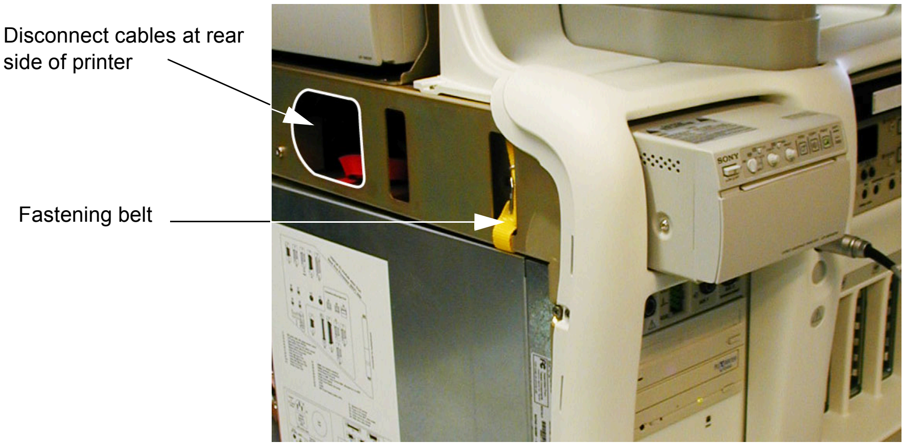


Figure 8-179 The B&W Video Printer location at the Front of the Scanner

8-48-6 Differences in Replacing the Digital B/W Printer

The Sony UPD-895 has only Power and USB connections (BEP USB#6 - C21) on the back panel.

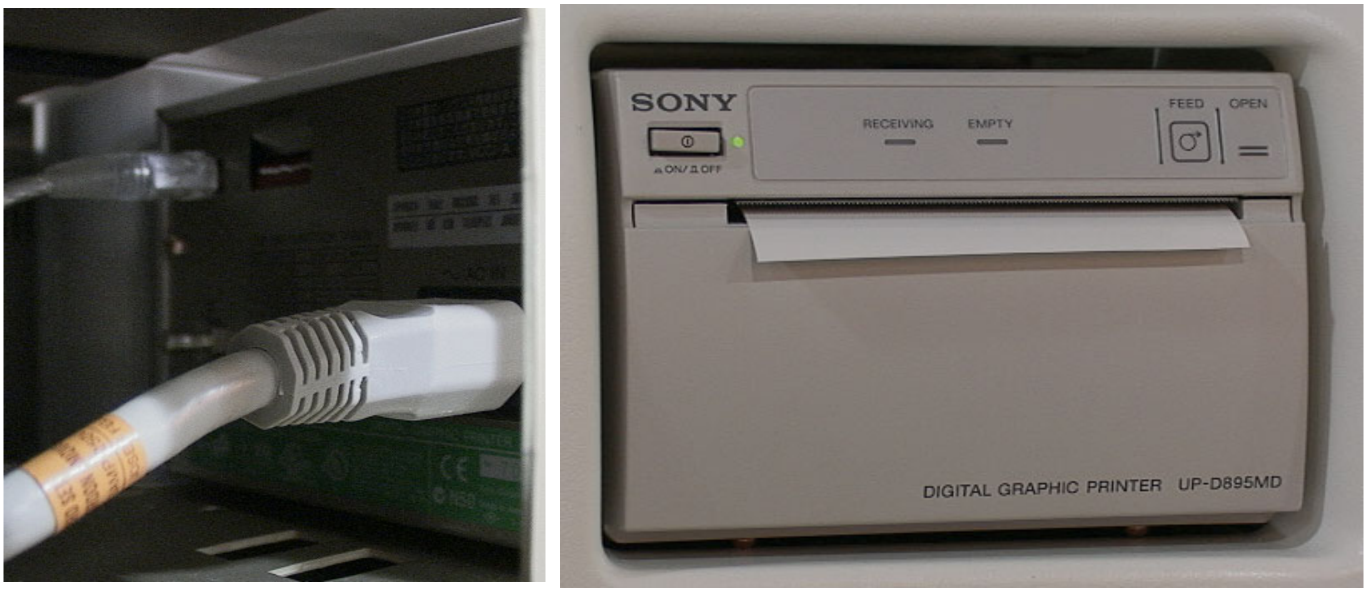


Figure 8-180 Sony UP-D895 Digital B/W Printer

Section 8-49
VCR Replacement Procedure

Click on the movie camear icon to view the video illustrating the removal and replacement of the VCR.

2 minutes and 9 seconds

8-49-1 Manpower

One person, 0.5 hours + travel.

8-49-2 Tools

Long Phillips driver.

8-49-3 Preparations(click here to view the cover removal video)

1.) Power Down/Shutdown the system as described in Section 4-3-2 on page 4-3.
2.) Remove the Left and Right Side Covers as shown on Section 8-2-2 on page 8-5.
3.) Raise the Control Console to its upper position and as far forwards as possible.
4.) Remove the Air Filter Cover and Top Cover as described on Section 8-2-3 on page 8-7.
5.) Disconnect probes and remove Front Cover as described on Section 8-2-5 on page 8-9.

8-49-4 Removal Procedure

1.) Loosen the fastening belts for the VCR and disconnect all the cables from the VCR.
2.) Remove the VCR from the frame.

8-49-5 VCR Mounting Procedure

1.) Place the VCR in the scanners frame and connect all the cables to the rear of the VCR.
2.) Fasten and tighten the straps to secure the VCR.
3.) Boot Up and test the system.
4.) Replace the covers (Top Cover, Front Cover and Side Covers). (click here to view the cover installation video)

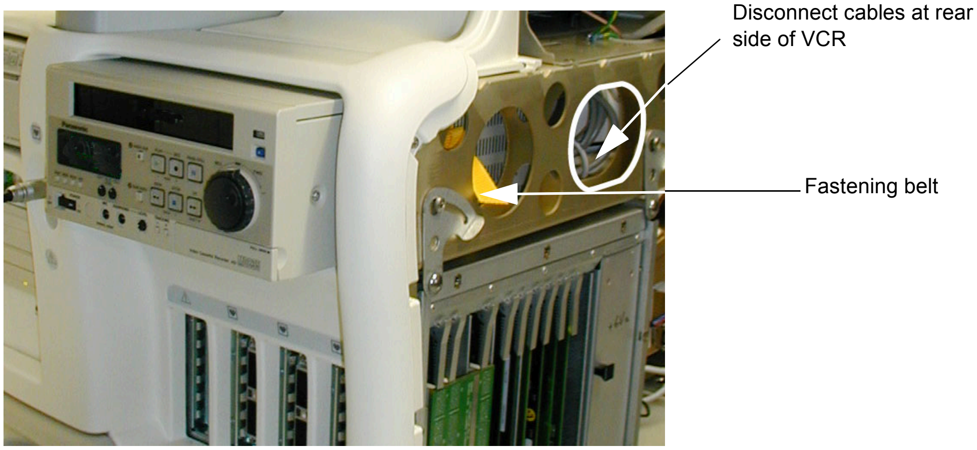


Figure 8-181 The VCR's Placement in the Scanner

Section 8-50
Wireless Voice Scan Option

8-50-1 Charging Batteries

Unpack the battery charger kit and inspect the parts.

NOTE: *Initially, batteries take several hours to charge. A working battery is required to complete the installation. If you did not start the batteries charging earlier. Do It Now.*

8-50-1-1 Battery Charger and Batteries

1.) Locate the battery charger and 9 Volt rechargeable batteries. The battery charger model may vary.

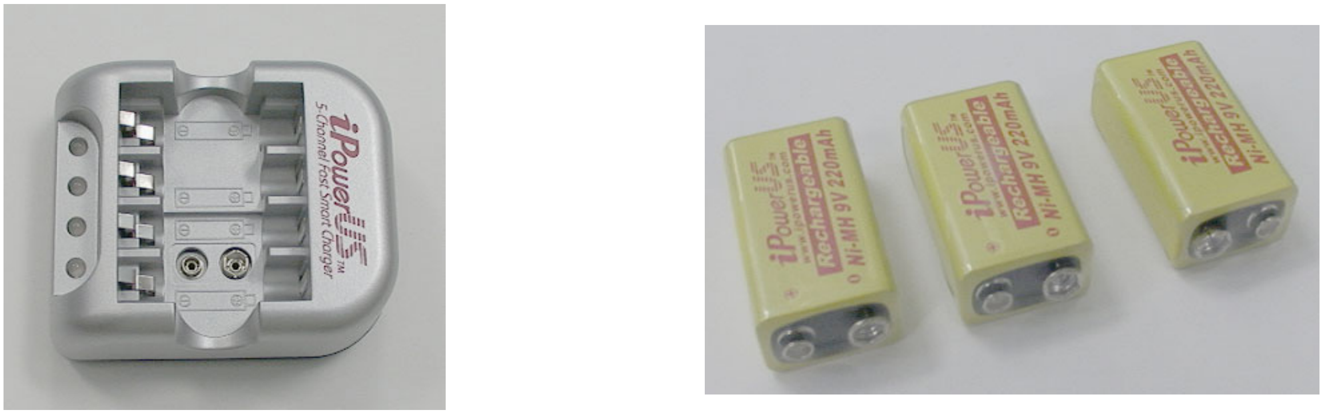


Figure 8-182 9V Batteries and Charger

2.) Remove the cellophane wrap from the batteries if present.

8-50-1-1Battery Charger and Batteries (cont'd)

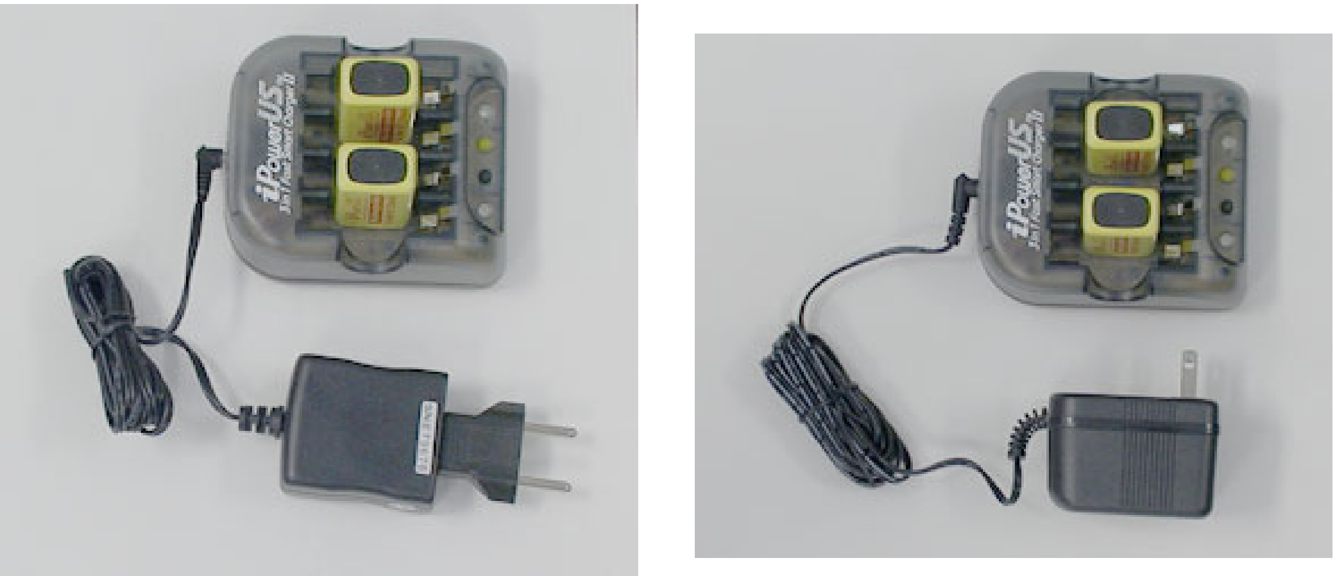


Figure 8-183 Power Adapter and Charger with Batteries

3.) Unwrap the battery charger power adapter.

The adapter for North American sites (120Vac only) comes with the charger.

An AC Adapter for international sites (100-240 Vac) is packaged separately. Also included is a set of AC plug adapters.

⚠ **WARNING** ***Do Not attempt to charge batteries other than the type included in the kit (NiMH). Standard alkaline batteries CANNOT be recharged.***

READ all safey precautions that come from the battery and battery charger manufacturers.

Plug the power adapter into the battery charger and AC outlet. Plug a 9 Volt battery into the charger.

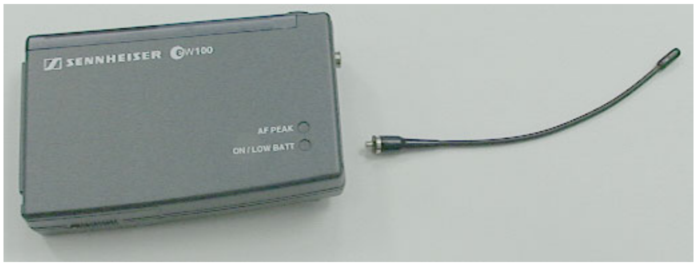
The first time new batteries are charged, it may take approximately 200 minutes to reach a full charge.

Recharging batteries will take from 75 to 120 minutes.

NOTE: A partially charged battery may be used to test the system, but available run time will be reduced.

8-50-2 Microphone/Transmitter Assembly

8-50-2-1 Assemble Transmitter



Transmitter with antenna

Figure 8-184 Transmitter and Microphone

1.) Screw the antenna into the antenna jack on the transmitter.
2.) Put a fully Charged Battery into the Transmitter
    a.) Open the battery door by sliding

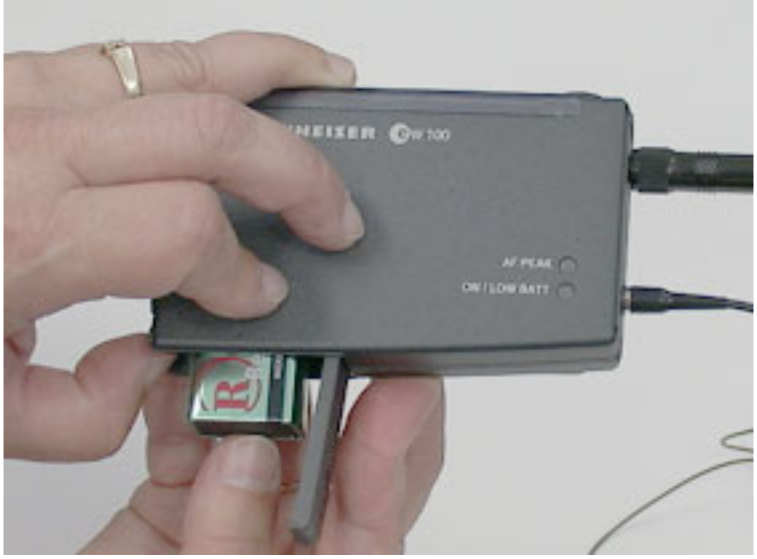
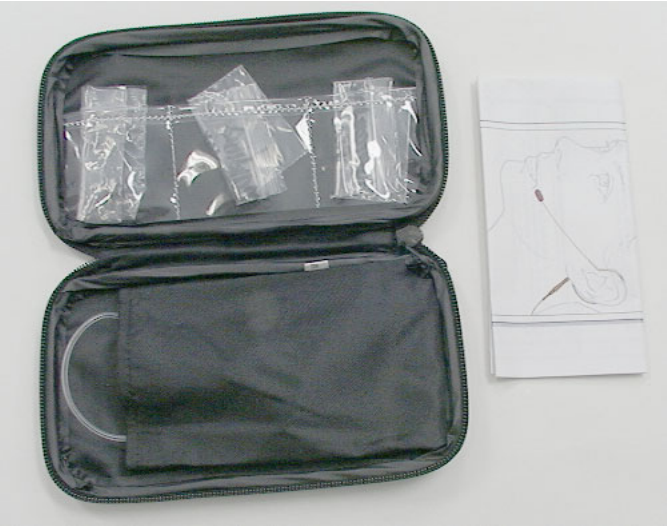


Figure 8-185 Changing the Battery

    b.) To remove a discharged battery , Hold the transmitter with one hand so that your thumb or finge can catch the battery.
    c.) User the other hand to pull on the red lever and let gravity pull the battery out and fall to your thumb.
    d.) Push the new battery in, make sure it is installed with the correct orientation of + and -
    e.) Close the door and slide to lock.

8-50-2-2 Assemble Microphone

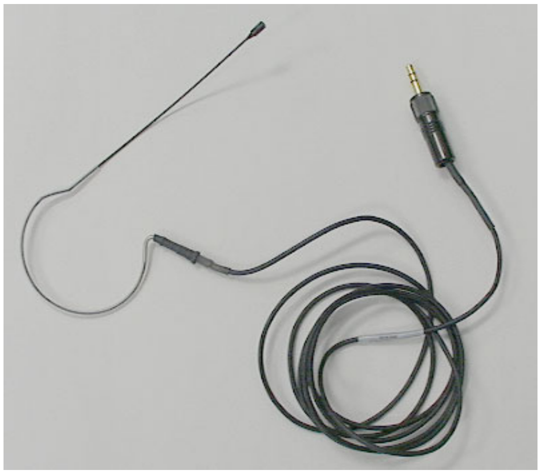
1.) Locate the transmitter and microphone with accessories.



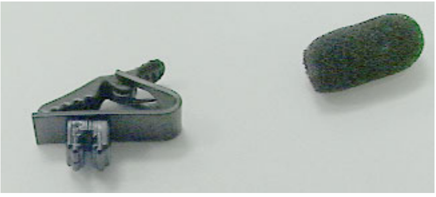
Microphone with accessories

Figure 8-186 Transmitter and Microphone

2.) Unpack the microphone.



Microphone



Microphone Clip and
Wind Screen

Figure 8-187 Microphone and Accessories

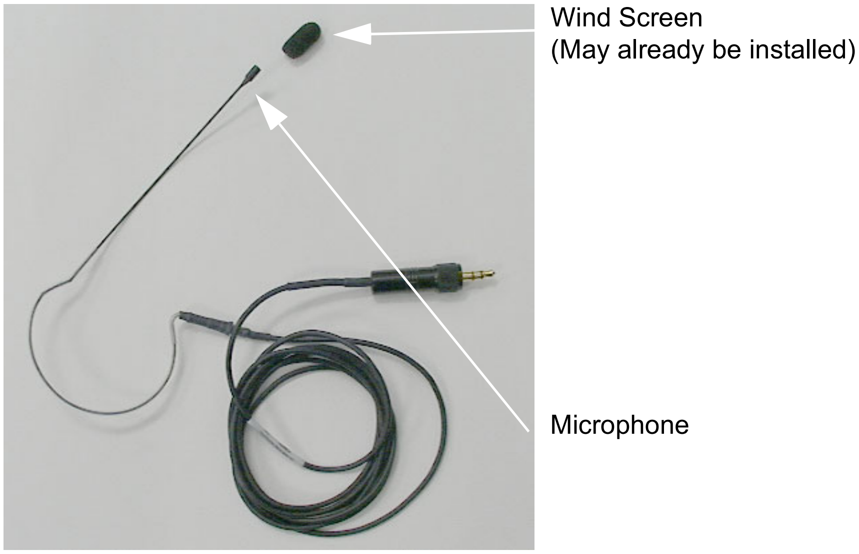


Figure 8-188 Microphone with Wind Screen

3.) With the windscreen off, note the taper from the microphone wire to the microphone element.

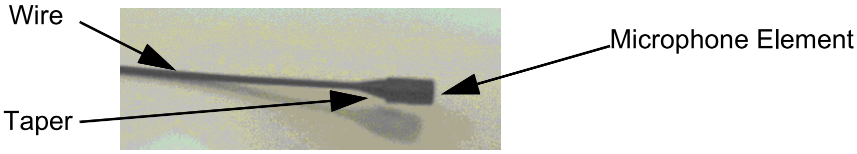


Figure 8-189 Tarnsmitter Microphone

4.) When putting on the wind screen, slightly twirl the foam in your fingers while threading it onto the microphone element. Once the element has entered the foam, you must push further to fit the plastic cap that is inside the foam onto the microphone element. This takes a little force and rocking motion.

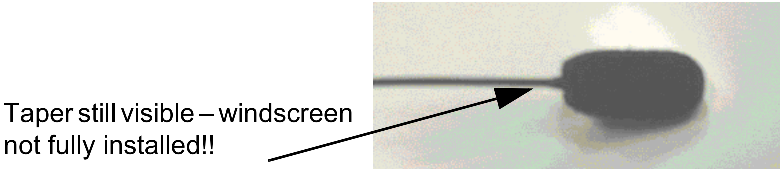
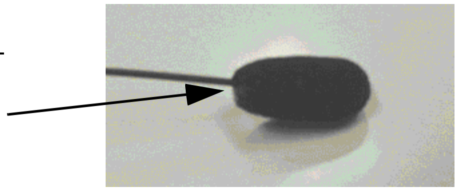


Figure 8-190 Improper Wind Screen Placement

5.) When fitted correctly, the taper should be totally covered by the windscreen. If you see the taper as in the above picture, the cap inside the foam is not pushed on all the way and the wind screen will easily fall off during use.



Taper fully covered – windscreen correctly installed

Figure 8-191 Proper Wind Screen Placement

6.) Plug the microphone assembly into the transmitter and secure it by tightening the outer collar. Refer to Figure 8-192 on page 8-180 .

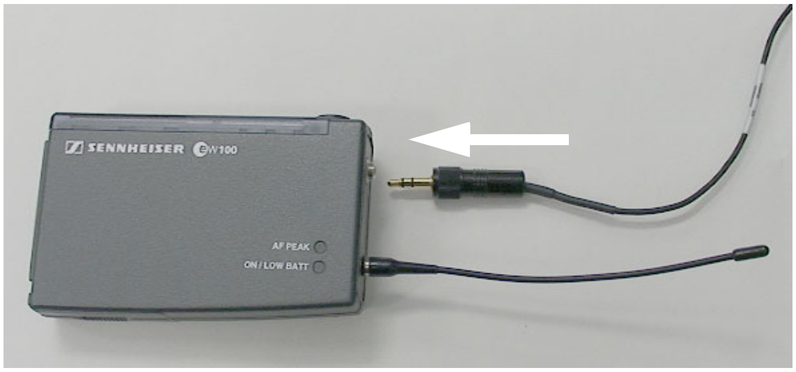


Figure 8-192 Plug Microphone into Transmitter

7.) Use the transmitter clip to place it on your belt or clothing. Place the microphone on your ear and position.

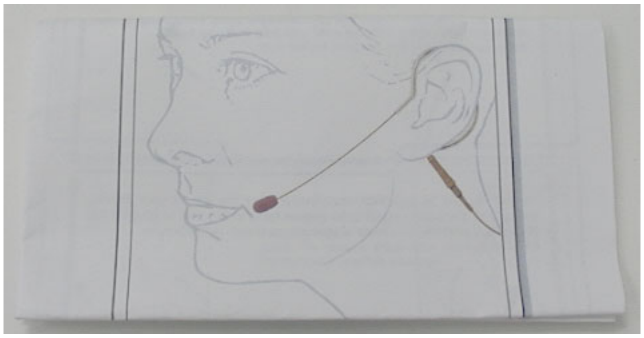
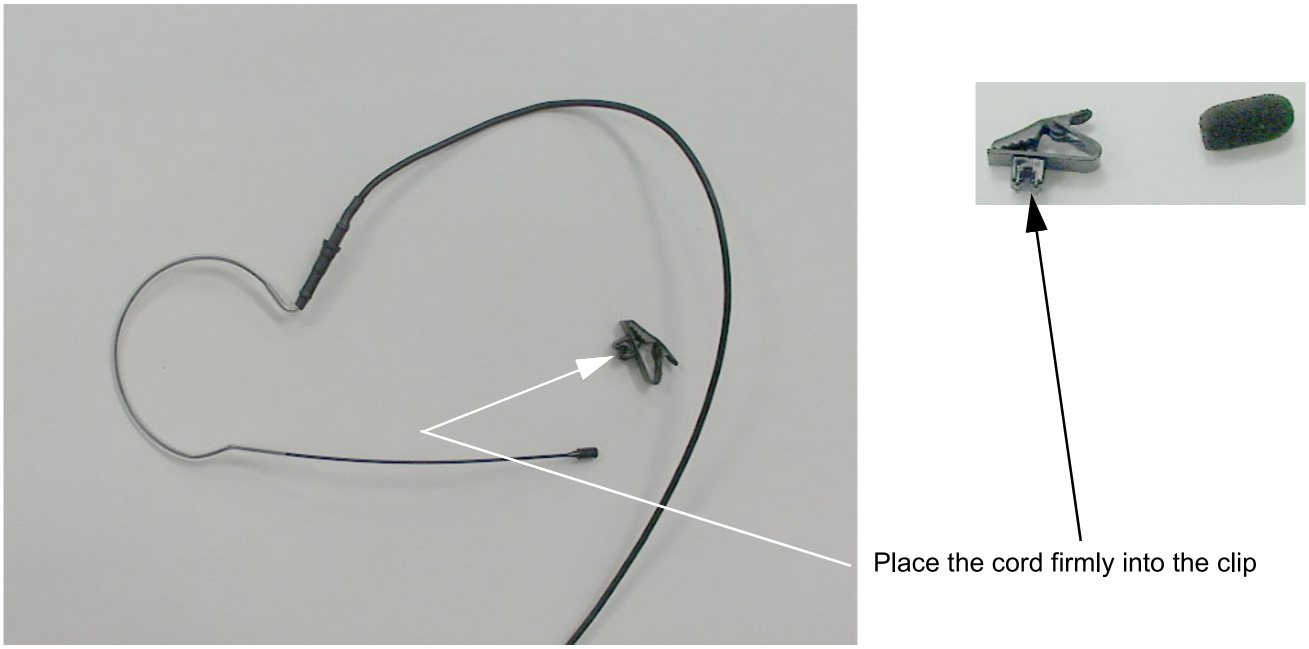


Figure 8-193 Microphone User Instructions

8.) Attach the cord clip to the microphone cord and attach the clip to your clothing to avoid changing the microphone postion during scanning.



Place the cord firmly into the clip

Figure 8-194 Cord Retention Clip

8-50-3 Receiver Setup

Remove Side Covers, Filter Cover and Top Cover if necessary.

You will see the receiver and its associated cables nested in a tray with foam.

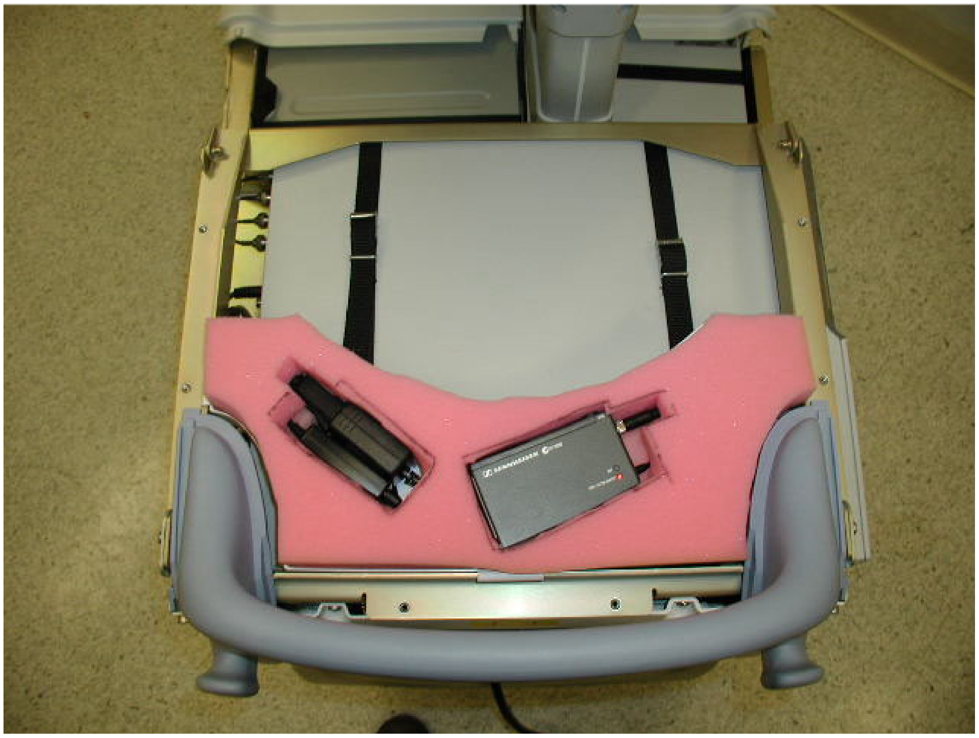


Figure 8-195 Voice Scan Receiver Tray Assembly

1.) Lift off the top foam so you can turn the receiver and look at its control panel.
2.) Install the Service Dongle and turn on the LOGIQ™ 9 .

8-50-3 Receiver Setup (cont'd)

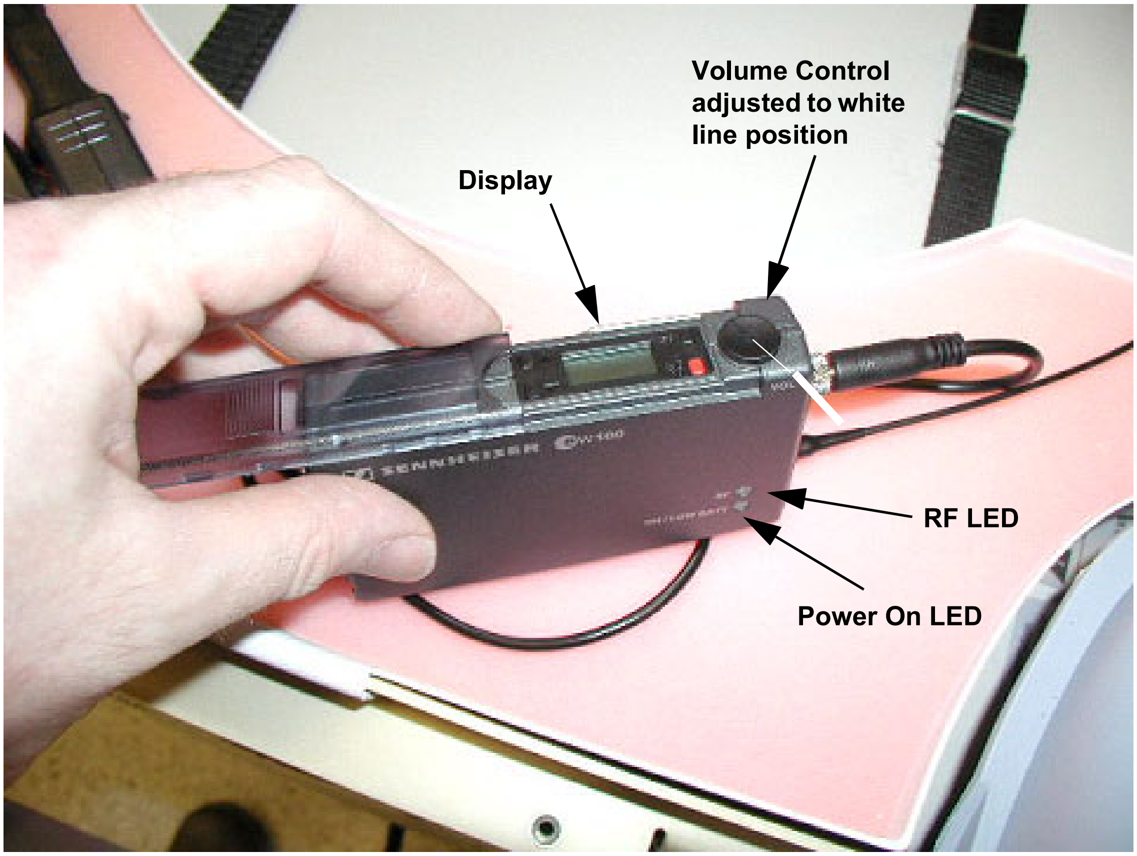


Figure 8-196 Receiver Controls

3.) Slide back the control cover before making any receiver adjustments.
4.) The Power On LED should be Illuminated (If not push the red button)
5.) Turn the Volume Control to 2:00
6.) Scroll thru the Menu by pushing the Set Button. Make sure the receiver is adjusted as follows:

- Squelch = 5 db
- Lock = off
- Display = Freq
- Tune = Read On.

Use the Arrow buttons to change the settings if necessary. When changed, the new setting will blink. To accept the change, push the set button.

7.) In the USA and Canada, the Wireless system will uses frequencies that are the same as TV Stations. Look on the back of your Receiver to see what the Freqency Range is. It should be the following:

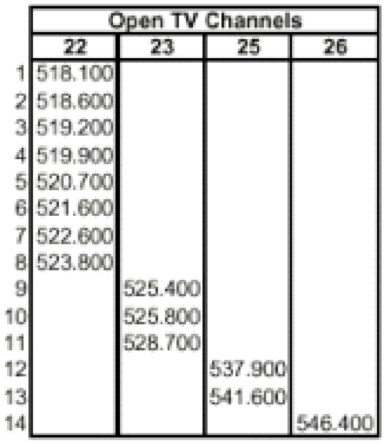
- 518-550MHz = A range – same as TV Stations 22 thru 27

8-50-3 Receiver Setup (cont'd)

8.) Check your local TV listings of your City (and Cities near you if you are within 60miles) to see which TV stations in your frequency band are NOT used. Note that some new HDTV stations are coming on line in these ranges.

9.) Refer to the charts in *section 7* of the "Evolution Wireless Custom Frequency Groupings by TV Channel" and select the chart which matches the combinations of unused TV stations you have available.

Example: With an "A" range transmitter, you must check TV stations 22 thru 27. If stations 22,23,25,26 are unused fequencies you would use the following chart:



	Open TV Channels			
	22	23	25	26
1	518.100			
2	518.600			
3	519.200			
4	519.900			
5	520.700			
6	521.600			
7	522.600			
8	523.800			
9		525.400		
10		525.800		
11		528.700		
12			537.900	
13			541.600	
14				546.400

Figure 8-197 TV Channel Chart Example

10.) Use the arrow buttons to tune to the second frequency in the list.

11.) Push Set to accept that frequency.

12.) Write down the frequency used (i.e. 518.600) ______________________. This will be used later when we update VPD data for Voice Scan.

NOTE: If you have multiple LOGIQ™ 9s with wireless Voice Recognition, the other LOGIQ™ 9s must use different frequencies.
Perform the Receiver Setup on your next LOGIQ™ 9s, this time picking the frequency that is 4th in the list.
For the remaining system receive frequency selections, avoid picking additional frequencies at the ends of the list and leave at least one frequency inbetween each frequency assigned to a LOGIQ™ 9.

13.) Put the receiver back down on the foam.

14.) Re-install the upper foam if necessary.

15.) Proceed to the transmitter setup.

8-50-3 Receiver Setup (cont'd)

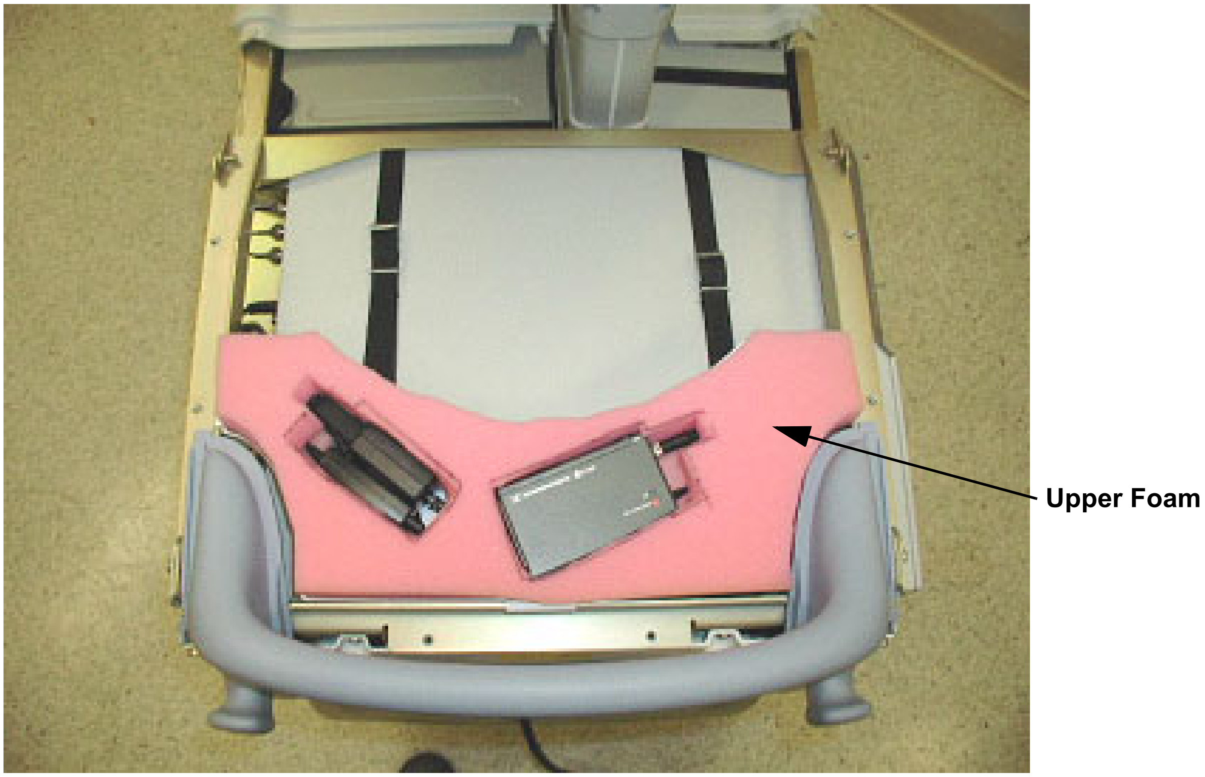


Figure 8-198 Upper Foam in Place

8-50-4 Transmitter Setup

8-50-4-1 Overview

To use wireless Voice Recognition, your microphone will be connected to a Transmitter which talks to a Receiver installed in the LOGIQ™ 9. If you have more than one LOGIQ™ 9 with wireless voice recogintion in your location, each LOGIQ™ 9's receiver must be set to a unique frequency per 8-50-3 "Receiver Setup" on page 8-182.

Transmitters must then be set to the same frequency as the receiver to talk to the LOGIQ™ 9. The Transmitters have 4 presets (which are called channels) so that you can conviently use one transmitter to talk to 4 different LOGIQ™ 9 receivers.

However, only one transmitter can be used at a time. Do not have multiple transmitters powered on and tuned to the same frequency and expect to have them both communicate with the same LOGIQ™ 9. Neither transmitter will work reliably in this situation.

8-50-4-2 Transmitter Adjustment

1.) Slide the control panel door open.

2.) Push the red button to turn power on. The ON/Low Batt LED should illuminate.

NOTE: *When the battery is low, the On/Low Batt LED will start to blink. This will only last for 5min or so. When the battery is dead, the unit will shut off and LED will be extinguished.*

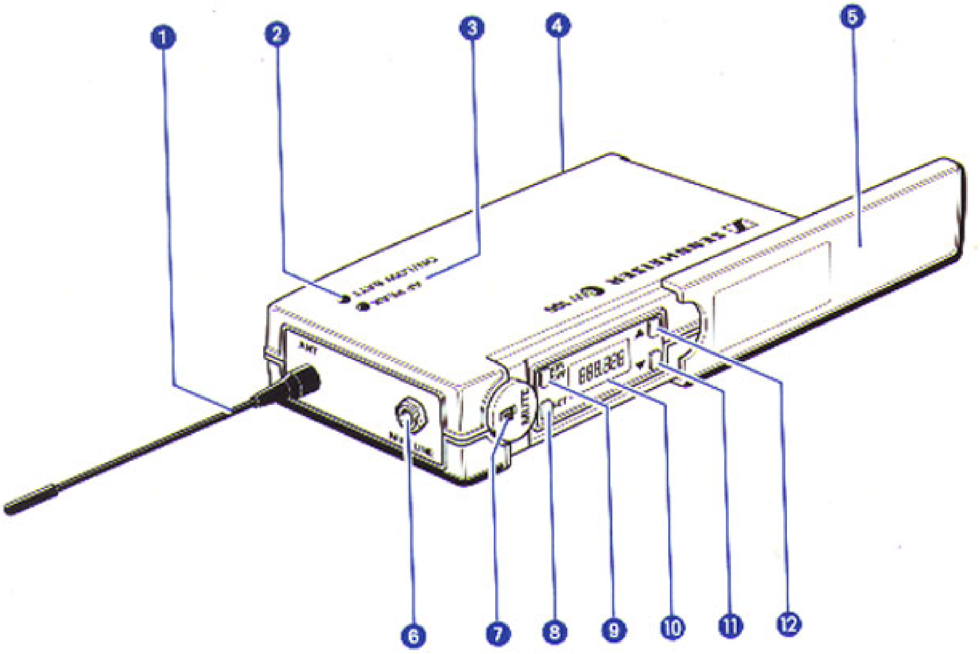


Figure 8-199 Transmitter

3.) Scroll thru the Menu by pushing the SET button, make sure it is set as follows:

- Sensitivity = -10 db
- Lock = off
- Display = Freq (if Channel is selected here, the unit will display the preset channel 1, 2, 3, or 4)
- Tune = to the same frequency as the LOGIQ™ 9 receiver.

Use the Arrow buttons to change the settings if necessary. When changed, the new setting will blink. To accept the change, push the set button.

4.) Check the RF LED on the receiver in the LOGIQ™ 9…it shold now be illuminated.

8-50-4-2Transmitter Adjustment (cont'd)

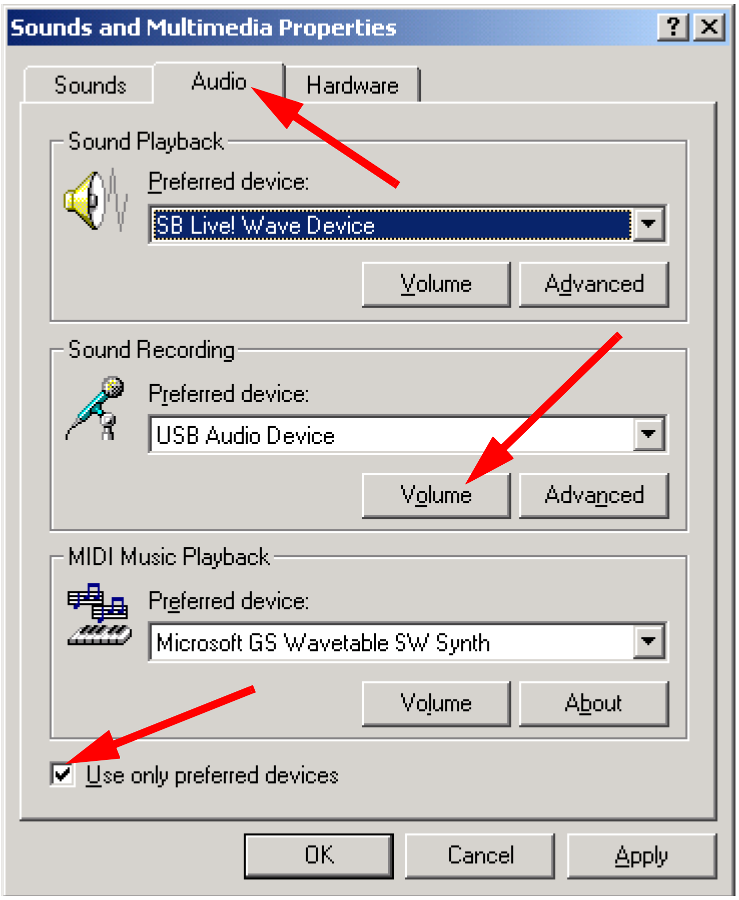
If you have multiple LOGIQ™ 9's with wireless use the Arrow buttons to select a different preset and push Set.

5.) Push Set again to enter the Menu and continue pushing Set until you get to Tune
6.) Select the frequency on the second LOGIQ™ 9's receiver using the Arrow Buttons, push Set to Enter.
7.) Check the RF LED on the receiver in the second LOGIQ™ 9, it should now be illuminated. The first LOGIQ™ 9 RF LED should be off.
8.) Continue with the 3rd and 4th presets if additional LOGIQ™ 9's are at the location.
9.) Perform the Volume Setup with each LOGIQ™ 9.

8-50-5 Volume Setup

8-50-5-1 Windows Audio Volume

1.) Install the Service Dongle.
2.) Put on the Microphone and Transmitter and turn it on.
3.) Select the preset which corresponds to the frequency setting on the LOGIQ™ 9 you are using.
4.) Make sure the Transmitter is NOT muted. (white switch)
5.) Type CRTL-ALT-Delete and select Task Manager.
6.) Select File>New Task (RUN), type in *explorer* and select OK
7.) Enable the cursor and drag the cursor to the bottom of the Touch Panel to get the Windows Taskbar.
8.) Go to *Start>Settings>Control Panel>Sounds and Multimedia.*
9.) Select the AUDIO Tab.



Preferred device: SB Live! Wave Device

Preferred device: USB Audio Device

Preferred device: Microsoft GS Wavetable SW Synth

☑ Use only preferred devices

Figure 8-200 Audio Tab

10.) Make sure the Preferred devices are the ones shown by checking the “Use only preferred devices” check box.
11.) Click the Volume button which is for “Sound Recording”
12.) You will get a window like the one shown in Figure 8-201.

8-50-5-1Windows Audio Volume (cont'd)

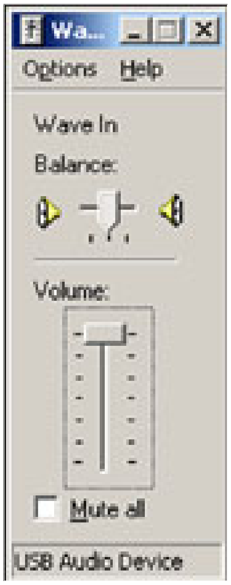


Figure 8-201 USB Audio Device Volume Setting

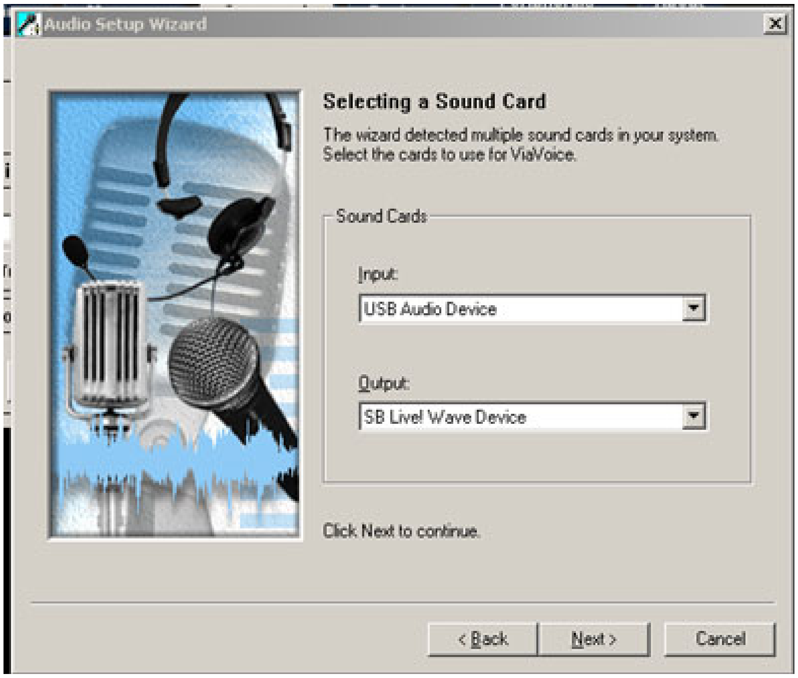
13.)You can close the Sounds and Multimedia window now to get it out of the way. However, DO NOT close the USB Audio Device volume slider window shown in Figure 8-201.

8-50-5-2 Audio Setup Wizard

14.)On the Touch Panel select Utilities>System

15.)On the Display Monitor select Voice Scan tab.

16.)When you get to the setup window, make sure the devices are selected as shown.



Selecting a Sound Card

The wizard detected multiple sound cards in your system. Select the cards to use for ViaVoice.

Sound Cards

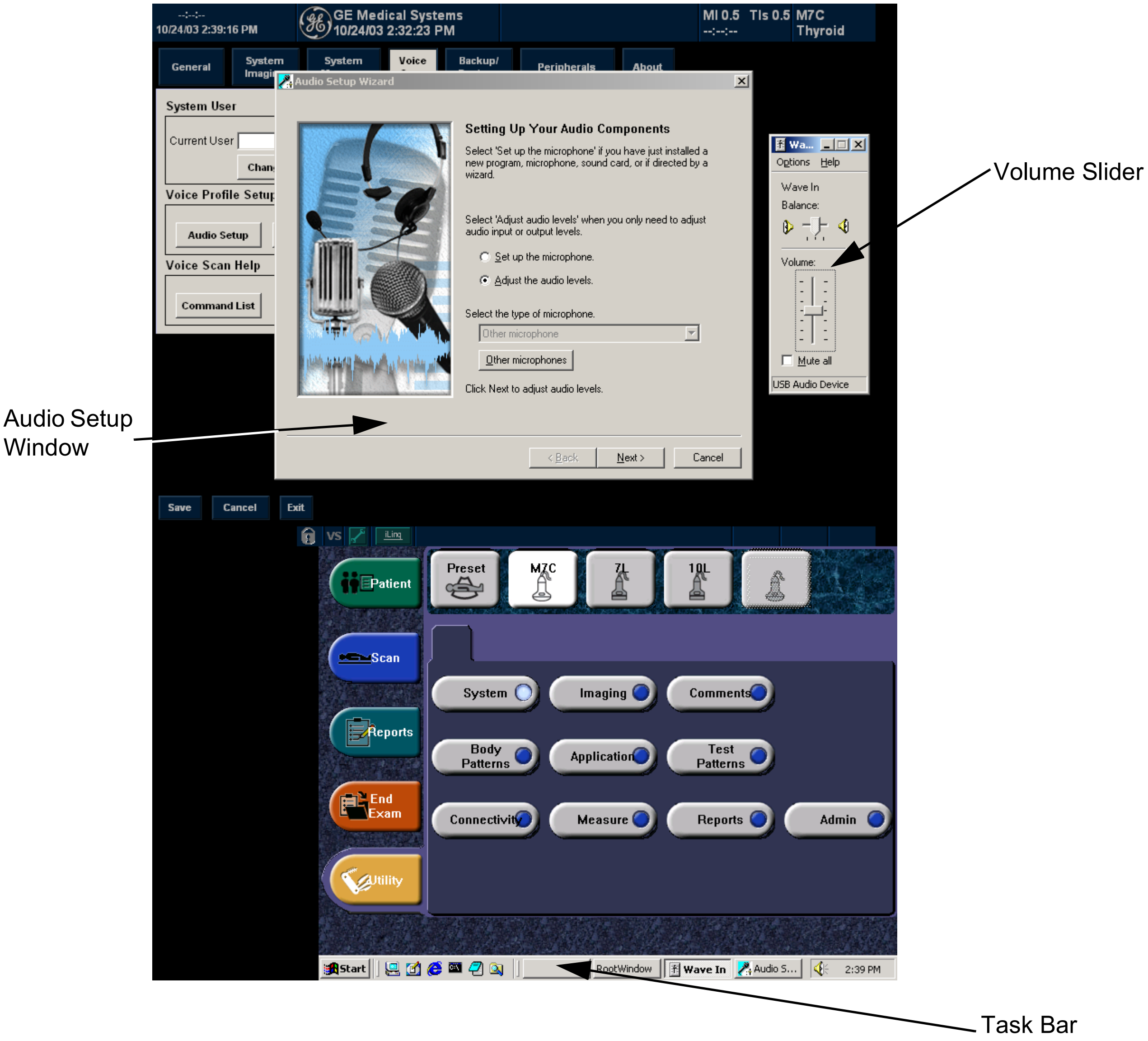
Input: USB Audio Device

Output: SB Live! Wave Device

Click Next to continue.

Figure 8-202 Audio Setup Wizard - Select Sound Card

NOTE: Make sure the Voulme Slider is still visible. If it is not visible click on the slider icon in the Windows Task Bar.



Setting Up Your Audio Components

Select 'Set up the microphone' if you have just installed a new program, microphone, sound card, or if directed by a wizard.

Select 'Adjust audio levels' when you only need to adjust audio input or output levels.

○ Set up the microphone.
● Adjust the audio levels.

Select the type of microphone.

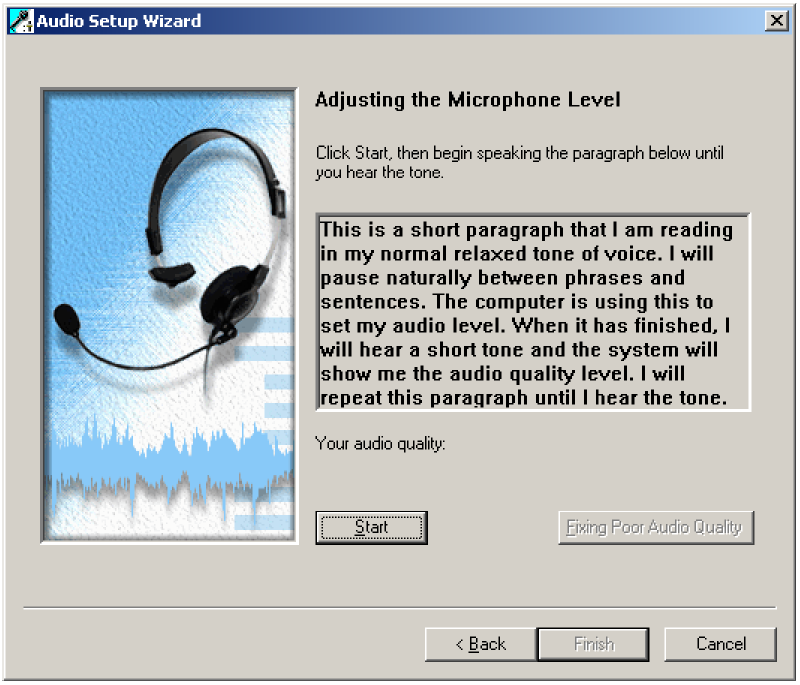
Other microphone

Other microphones

Click Next to adjust audio levels.

Figure 8-203 Composite Screen Display

17.) Continue on to the Microphone setup and you will see this window.



Adjusting the Microphone Level

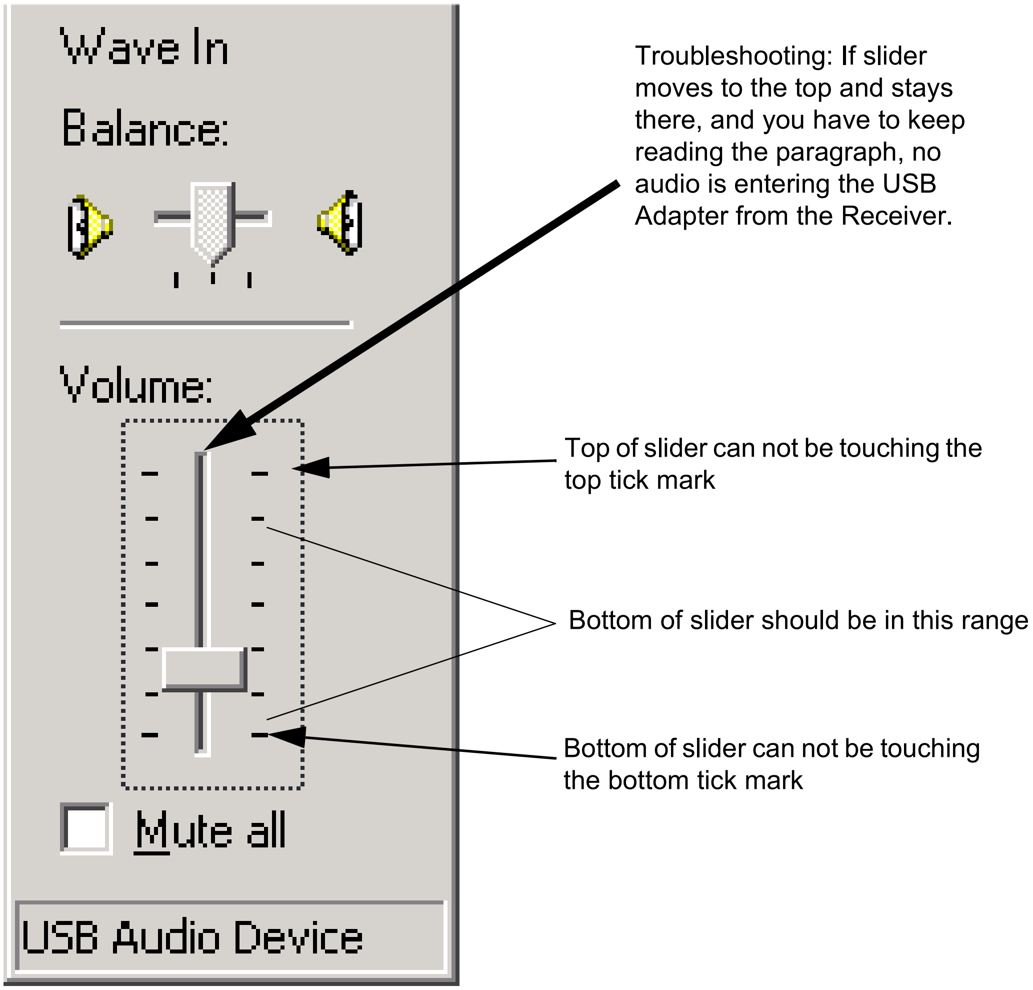
Click Start, then begin speaking the paragraph below until you hear the tone.

This is a short paragraph that I am reading in my normal relaxed tone of voice. I will pause naturally between phrases and sentences. The computer is using this to set my audio level. When it has finished, I will hear a short tone and the system will show me the audio quality level. I will repeat this paragraph until I hear the tone.

Your audio quality:

Figure 8-204 Audio Setup Wizard - Adjust Level

18.) Notice that the slider on the other window has moved to the middle position.
19.) Push “Start” and read the paragraph
20.) You should have audio quality of Very Good or Excellent when finished.
21.) Check the slider, it should be in the area shown Figure 8-205 on page 8-194 .



Troubleshooting: If slider moves to the top and stays there, and you have to keep reading the paragraph, no audio is entering the USB Adapter from the Receiver.

Top of slider can not be touching the top tick mark

Bottom of slider should be in this range

Bottom of slider can not be touching the bottom tick mark

Figure 8-205 Volume Slider

22.) If the slider is too high, turn the Volume Dial on the receiver slightly CW
23.) If the slider is too low, turn the Volume Dial on the receiver slightly CCW
24.) Repeat the Microphone Setup and turn the Volume Dial until the slider is in a good spot.
25.) The receiver is now set up correctly…reassemble the covers.

Chapter 9
Renewal Parts

Section 9-1
Overview

9-1-1 Purpose of Chapter 9

This chapter gives you an overview of Spare Parts available for the LOGIQ™ 9.

Table 9-1 Contents in Chapter 9

Section	Description	Page Number
9-1	Overview	9-1
9-2	List of Abbreviations	9-2
9-3	Parts List Groups	9-3
9-4	External Covers	9-4
9-5	Additional Console Hardware	9-6
9-6	Operator I/O Mechanical Parts	9-8
9-7	Mechanical Kits	9-9
9-8	Operator Control Panel Brackets	9-11
9-9	Operator Control Panel Assembly	9-12
9-10	Monitor Assembly	9-14
9-11	Front End Processor Assembly	9-15
9-12	I/O Interfaces	9-18
9-13	Back End Processor Assembly	9-19
9-14	Interconnect Cables	9-25
9-15	Power Distribution	9-36
9-16	Air Distribution	9-37
9-17	Peripherals	9-38
9-18	Voice Scan	9-39
9-19	Customer Documentation	9-40
9-20	Probes	9-41

9-1-2 LOGIQ™ 9 Models Numbers

Table 9-2 LOGIQ™ 9 Model Designations

Part Number	Description
2188900	LOGIQ™ 9 120 V Console & Peripherals - BEP1.0
2188900-2	LOGIQ™ 9 240V Console & Peripherals - BEP1.0
2188900-3	LOGIQ™ 9 120V Console & 240V Peripherals - BEP1.0
2188900-4	LOGIQ™ 9 120 V Console & Peripherals - BEP2.0
2188900-5	LOGIQ™ 9 240V Console & Peripherals - BEP2.0
2188900-6	LOGIQ™ 9 120V Console & 240V Peripherals - BEP2.0
2351100	LOGIQ™ 9 120 V Console & Peripherals - BEP2.1 BT'02
2351100-2	LOGIQ™ 9 240V Console & Peripherals - BEP2.1 BT'02
2351100-3	LOGIQ™ 9 120V Console & 240V Peripherals - BEP2.1 BT'02
2375600	LOGIQ™ 9 120 V Console & Peripherals - BEP2.2 BT'03
2375600-2	LOGIQ™ 9 240V Console & Peripherals - BEP2.2 BT'03
2375600-3	LOGIQ™ 9 120V Console & 240V Peripherals - BEP2.2 BT'03

Special Service Tool: A service dongle (part number 066E0703) is required for some GE proprietary operations.

Section 9-2
List of Abbreviations

- Assy - Assembly
- BEP - Back End Processor
- Ctrl - Control
- FEP - Front End Processor
- F.O.B - Flock of Birds or 3-D Option
- FRU 1 - Replacement part available in parts hub
- FRU 2 - Replacement part available from the manufacturer (lead time involved)
- LCD - Liquid Crystal Display
- Int -Internal
- I/O - Input/Output
- PWA - Printed Wire Assembly
- Recv - Receive
- XFRMR - Transformer

Section 9-3
Parts List Groups

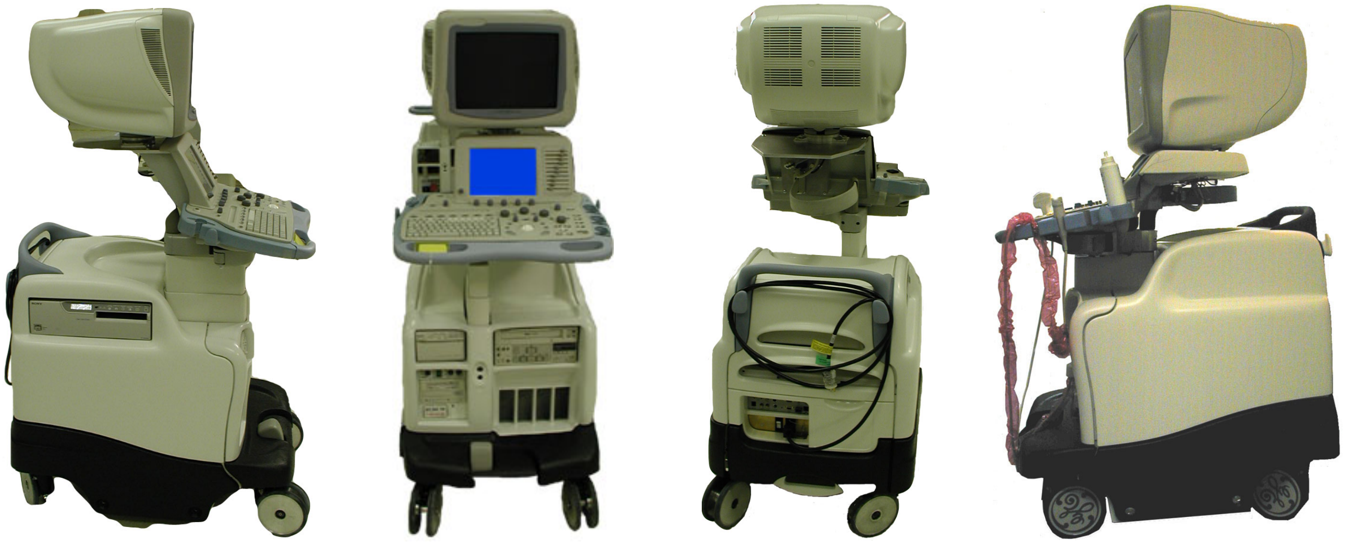


Figure 9-1 Console Views

Table 9-3 Parts Groups

Item	Part Group Name	Table Number	Description		
100-	External Covers	Table 9-4	External covers and cavity fillers		
140-	Additional Console Hardware	Table 9-5			
170-	Operator I/O Mechanical Parts	Table 9-6			
200	Operator Control Panel Assembly	Table 9-10	User Interface: Keyboard Trackball, TGC Assy., Foot Pedal		
300	Monitor Assembly	Table 9-11	Monitor, Rear Cover, Front Bezel, Mounting, Tilt, Swivel		
400-	Front End Processor Assembly	Table 9-12	Xmit/Recv, Signal Pre-Processing, Control		
450-	I/O Interfaces	Table 9-13	Front End/Back End Interface, BEP External Interface		
470-	Back End Processor Assembly	Table 9-14			
500	Peripheral Cables	Table 9-15 Table 9-16 Table 9-17			
600-	Power Distribution	Table 9-18			
650-	Air Distribution Parts	Table 9-19			
800-	Customer Documentation	Table 9-22			
900-	Probes	Table 9-23			

Section 9-4
External Covers

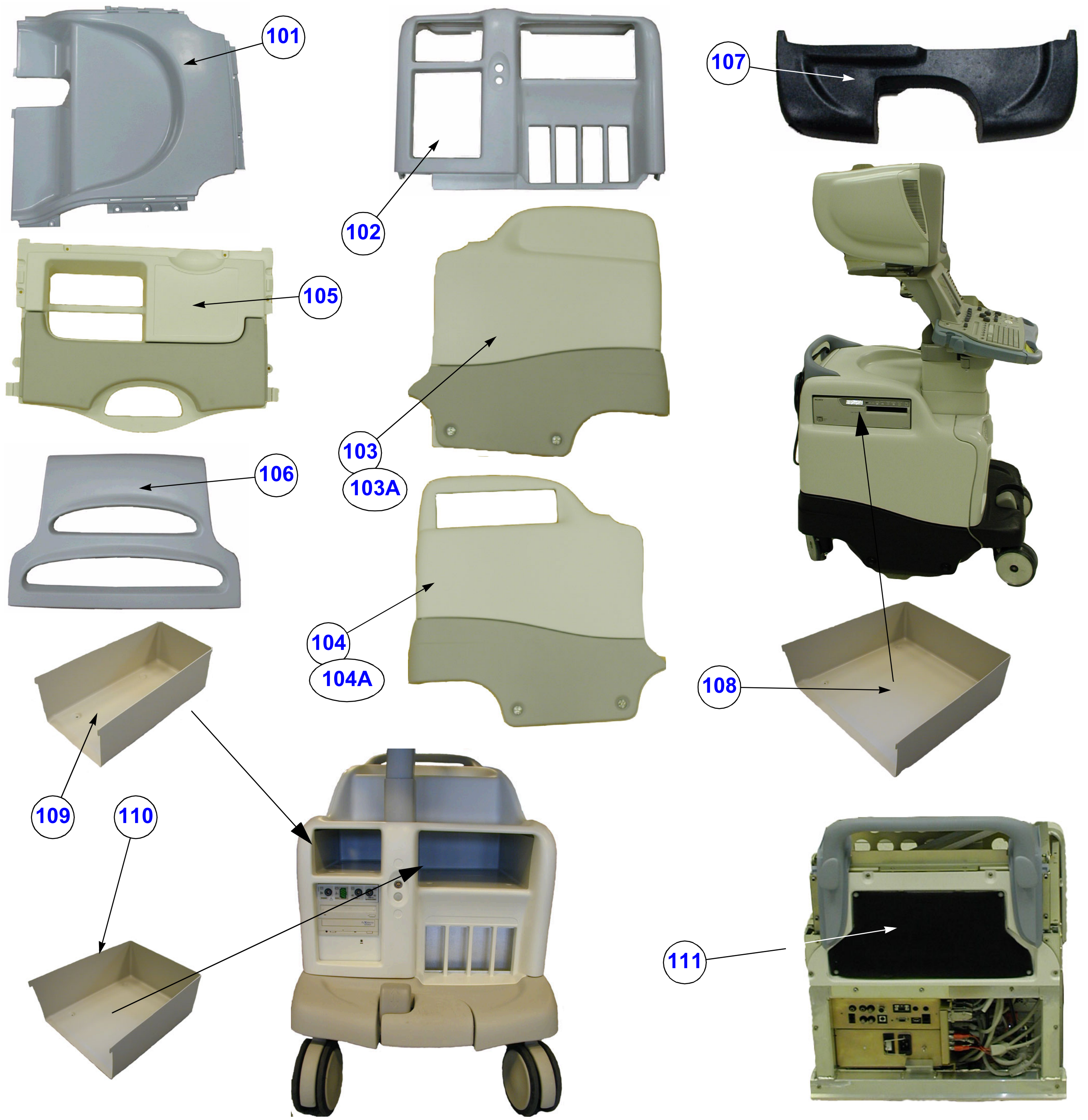


Figure 9-2 External Covers

Table 9-4 External Covers

Item	Part Name	Part Number	Description	Qty	FRU
101	Top Cover	FB307383		1	1
102	Front Cover Assembly	FC200076	with Two Labels, Apply the Appropriate Label	1	1
103	Right Side Cover Assembly	FC200074	with bumper - *Same as Vivid 7 -*	1	1
103A	Right Side Cover Assembly	FC200422	with bumper and GE Logo. If ordering to replace non-logo cover, also order FC200421 and replace set	1	1
104	Left Side Cover Assembly	FC200073	with bumper - *Same as Vivid 7 -*	1	1
104A	Left Side Cover Assembly	FC200421	with bumper and GE Logo. If ordered to replace non-logo cover, also order FC200422 and replace set	1	1
105	Rear Cover Assembly	FC200077	with bumper - *Same as Vivid 7 -*	1	1
106	Rear Filter Cover	FB200385	with brackets - *Same as Vivid 7 -*	1	1
107	Footrest Bumper	FB307387		1	1
108	Color Printer Cavity Filler Insert	FB307990	*- Same as Vivid 7 -*	1	1
109	B/W Printer Cavity Filler Insert	FB307989	*- Same as Vivid 7 -*	1	1
110	VCR Cavity Filler Insert	FB307988	*- Same as Vivid 7 -*	1	1
111	Filter Media	FB307903	Dust Filter - *Same as Vivid 7 -*	1	1

Section 9-5
Additional Console Hardware

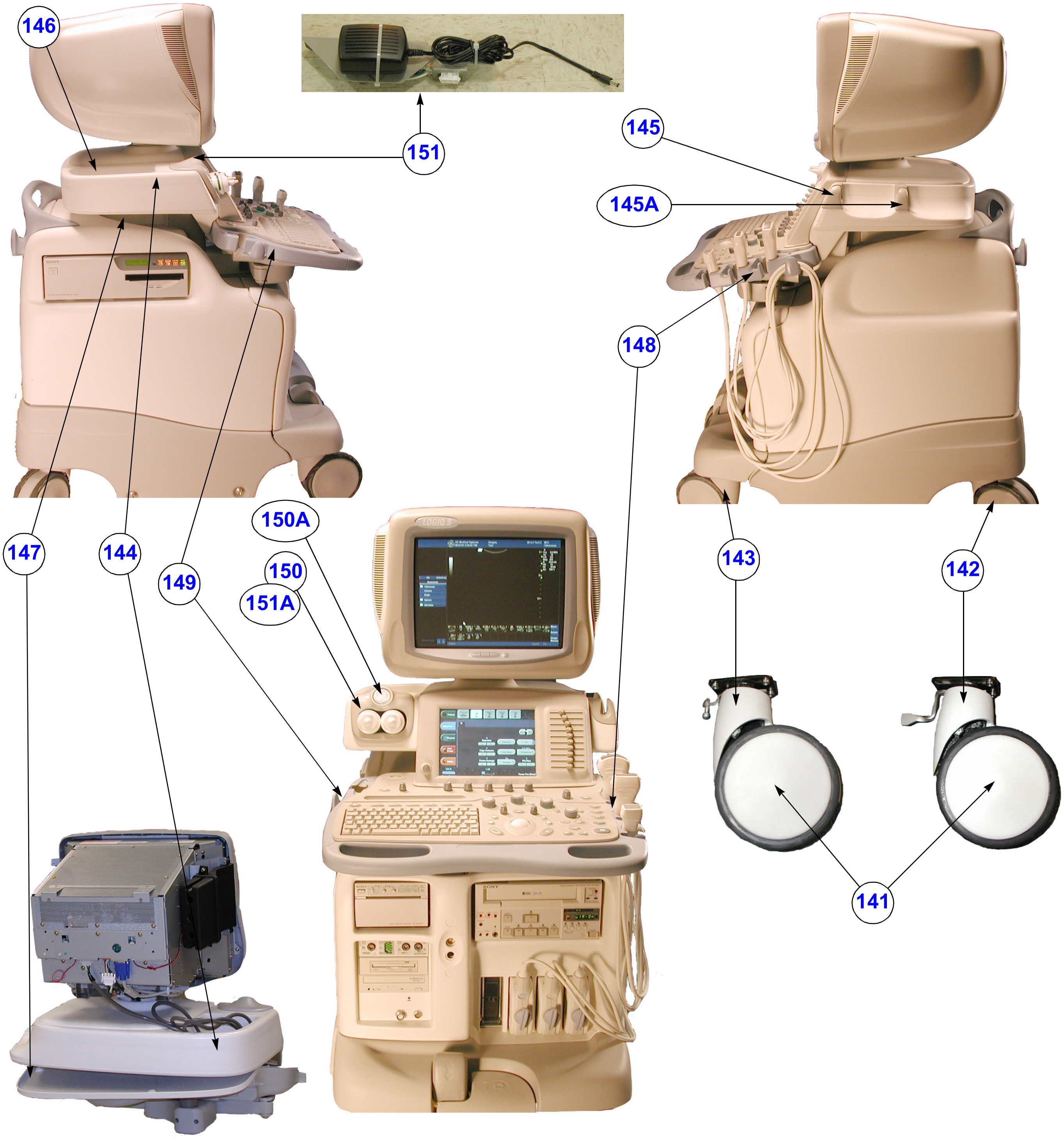


Figure 9-3   Additional Console Hardware

Table 9-5 Additional Console Hardware

Item	Part Name	Part Number	Description	Qty	FRU
141	Caster Hub Caps	2293008-5	Need to order 2 per caster, adhesive mounting	1	1
142	Rear Casters (wheels)	2293008-3	Does Not Have Pedal Activated Swivel Lock Assembly. Manual Swivel Lock *- Same as Vivid 7 -*	2	1
143	Front Casters (wheels)	2293008-2	Includes Swivel Lock Assembly *- Same as Vivid 7 -*	2	1
144	Shelf Cover	2291452		1	1
145	TV/TR Probe Holder Front	2291455		1	1
145A	TV/TR Probe Holder Rear	2299040			
146	Pocket Shelf Mat	2291453		1	1
147	Under Shelf Cover	2291454		1	2
148	Right Probe Holder Assembly	2299038		1	1
149	Left Probe Holder Assembly	2299039		1	1
150	Gel Warmer Assembly * see note	2291461	*Need to order GE Logo Decal 2269030-15	1	1
150A	GE Logo Decal for Gel Warmer	2269030-15	Must order when replacing Gel Warmer	1	1
151	Gel Warmer Power Source	2329637	12VDC Power Source - Obsolete	1	1
151A	Gel Warmer Power Source	2329637-3	6VDC Power Source	1	1

Section 9-6
Operator I/O Mechanical Parts

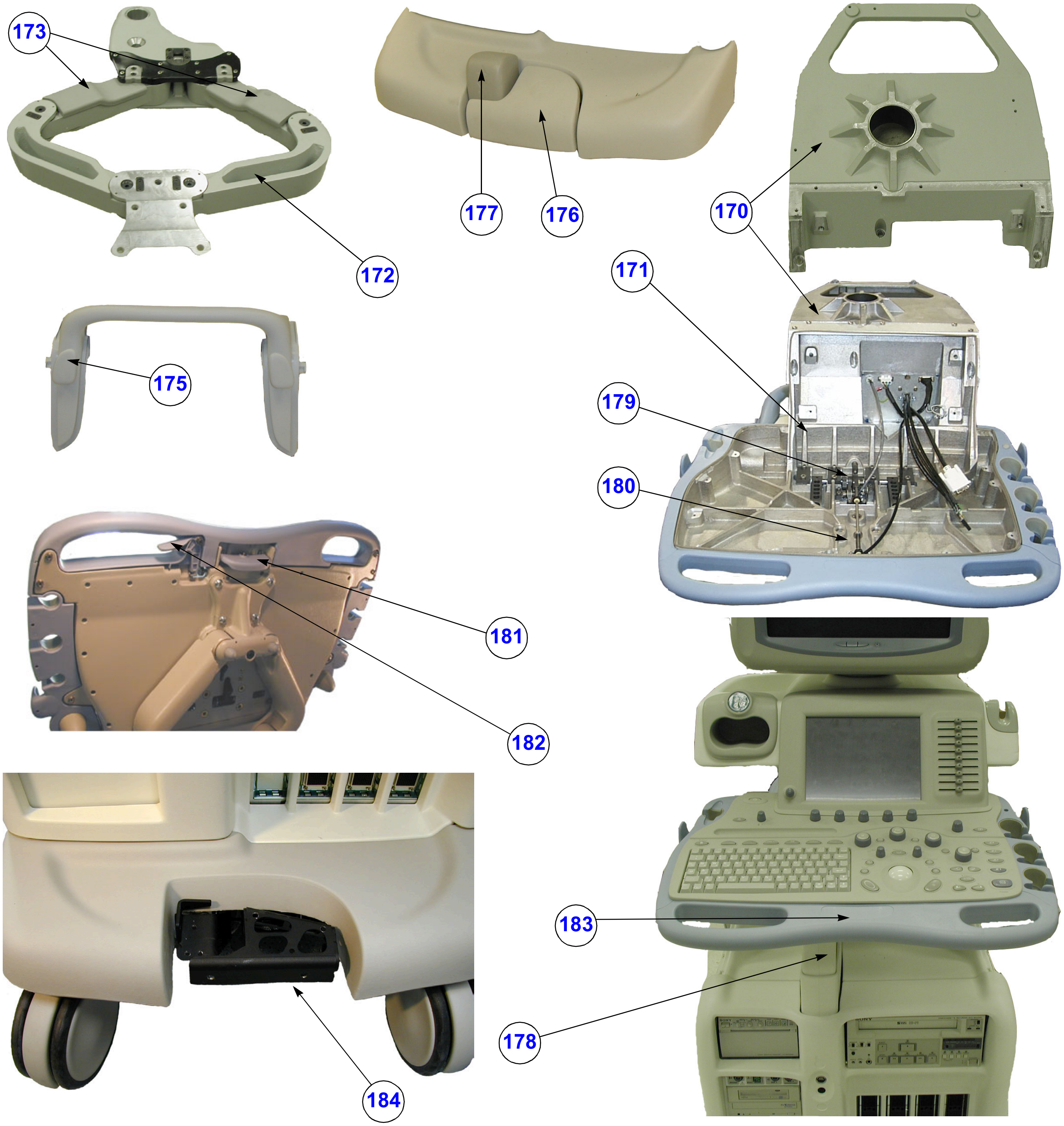


Figure 9-4 OP I/O Mechanical Parts

Table 9-6 Operator I/O Mechanical Parts

Item	Part Name	Part Number	Description	Qty	FRU
170	Top Console Upper Casting Assembly	2331665	Assembly for Service	1	2
171	Top Console Lower Casting Assembly	2331858	Assembly for Service	1	2
172	Frogleg (complete)	FB200340	*- Same as Vivid 7 -*	1	2
173	Frogleg Bumper Kit	FC200086	goes on back/top half of Frogleg arms *- Same as Vivid 7 -*	1	1
175	Rear Handle Assembly	FB200406	with cable wrap hooks *- Same as Vivid 7 -*	1	1
176	Brake Lock Pedal	FB307407		1	1
177	Directional Lock Pedal	FB307409	Swivel Lock Pedal	1	1
178	Column Cover Kit	FC200183	*- Same as Vivid 7 -*	1	1
179	Top Console Lock Assembly	FB200350	*- Same as Vivid 7 -*	1	2
180	Lock Release	FB200920	*- Same as Vivid 7 -*	1	2
181	X-Y Release Handle	FB307297	*- Same as Vivid 7 -*	1	2
182	Z-Release Handle	FB307296	*- Same as Vivid 7 -*	1	2
183	Main Handle with Label	FC200131	Front Handle with Label in center	1	1
184	Pedal Assembly	FB200595	*- Same as Vivid 7 -*	1	1

Section 9-7
Mechanical Kits

Table 9-7 Kits, Overview

Item	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	BUMPER KIT FROGLEG	FC200086	BUMPER KIT, FROGLEG *- Same as Vivid 7 -*	1	1
2	COLUMN COVER KIT	FC200183	COLUMN COVER KIT *- Same as Vivid 7 -*	1	1

9-7-1 Bumper Kit, Frogleg

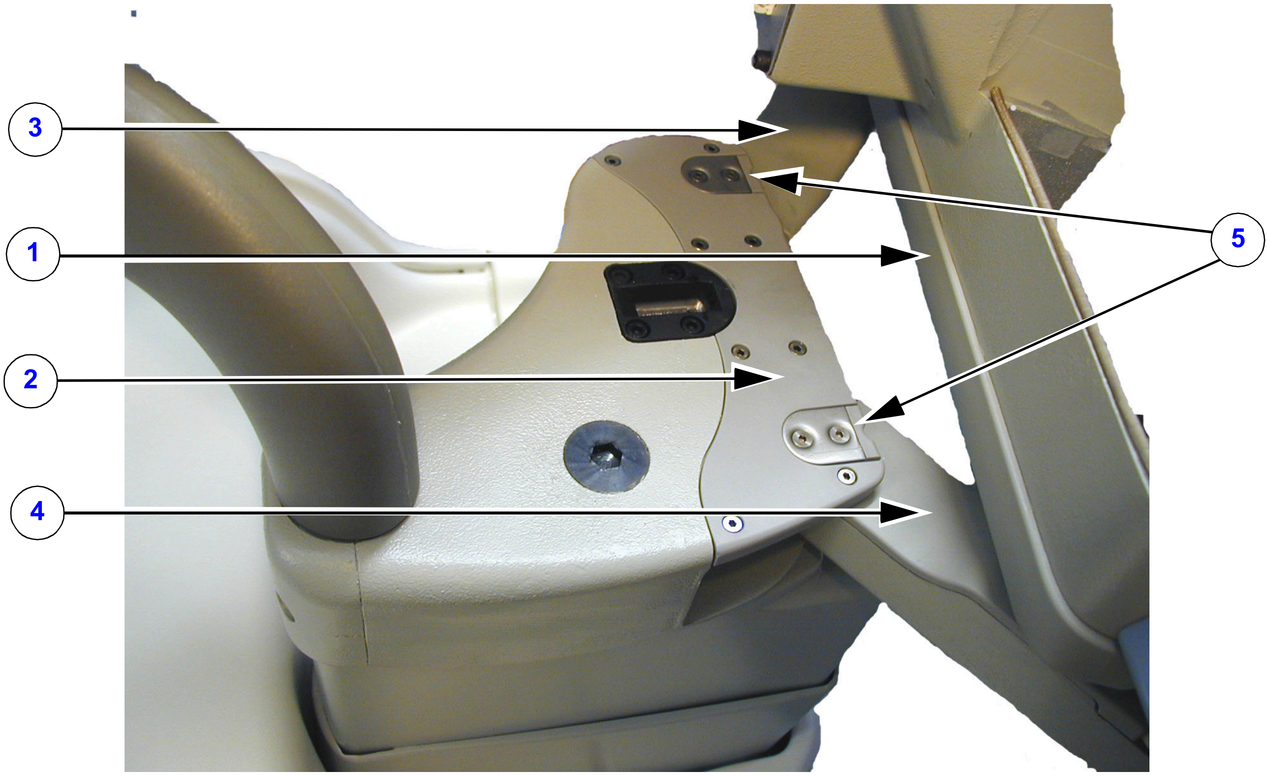


Figure 9-5 Bumper Kit, Frogleg, Base Seen From Above

Table 9-8 Bumper Kit, Frogleg FC200086

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
1	BUMPER CRASH PAD	-	Bumper Crash Rear	1	N
2	BUMPER INNER BOSS	-	-	1	N
3	BUMPER RIGHT FROGLEG	-	-	1	N
4	BUMPER LEFT FROGLEG	-	-	1	N
5	BUMPER INNER BOSS CRASH	-	-	2	N

Section 9-8
Operator Control Panel Brackets

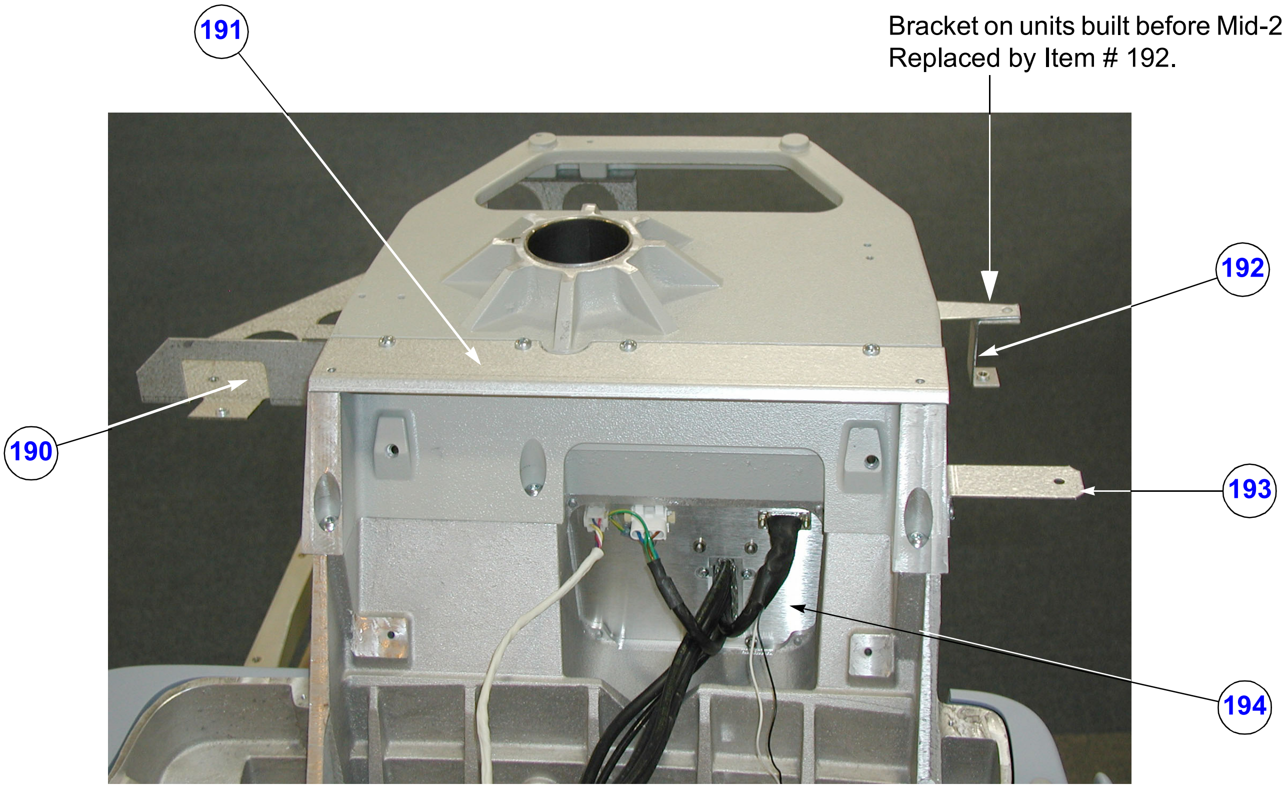


Figure 9-6 Operator Panel Brackets

Table 9-9 Operator Panel Brackets

ITEM	PART NAME	PART NUMBER	DESCRIPTION	QTY	FRU
190	Storage Tray Bracket	2306018		1	2
191	Upper Casting Bracket	2291449		1	2
192	“U” Bracket	2330476	‘U’ Shaped Bracket, Nut is Attached to Casting	1	2
193	TV/TR Front Bracket	2306021		1	2
194	Bulkhead Bracket	2305886	Does Not Include Cables	1	2

Section 9-9
Operator Control Panel Assembly

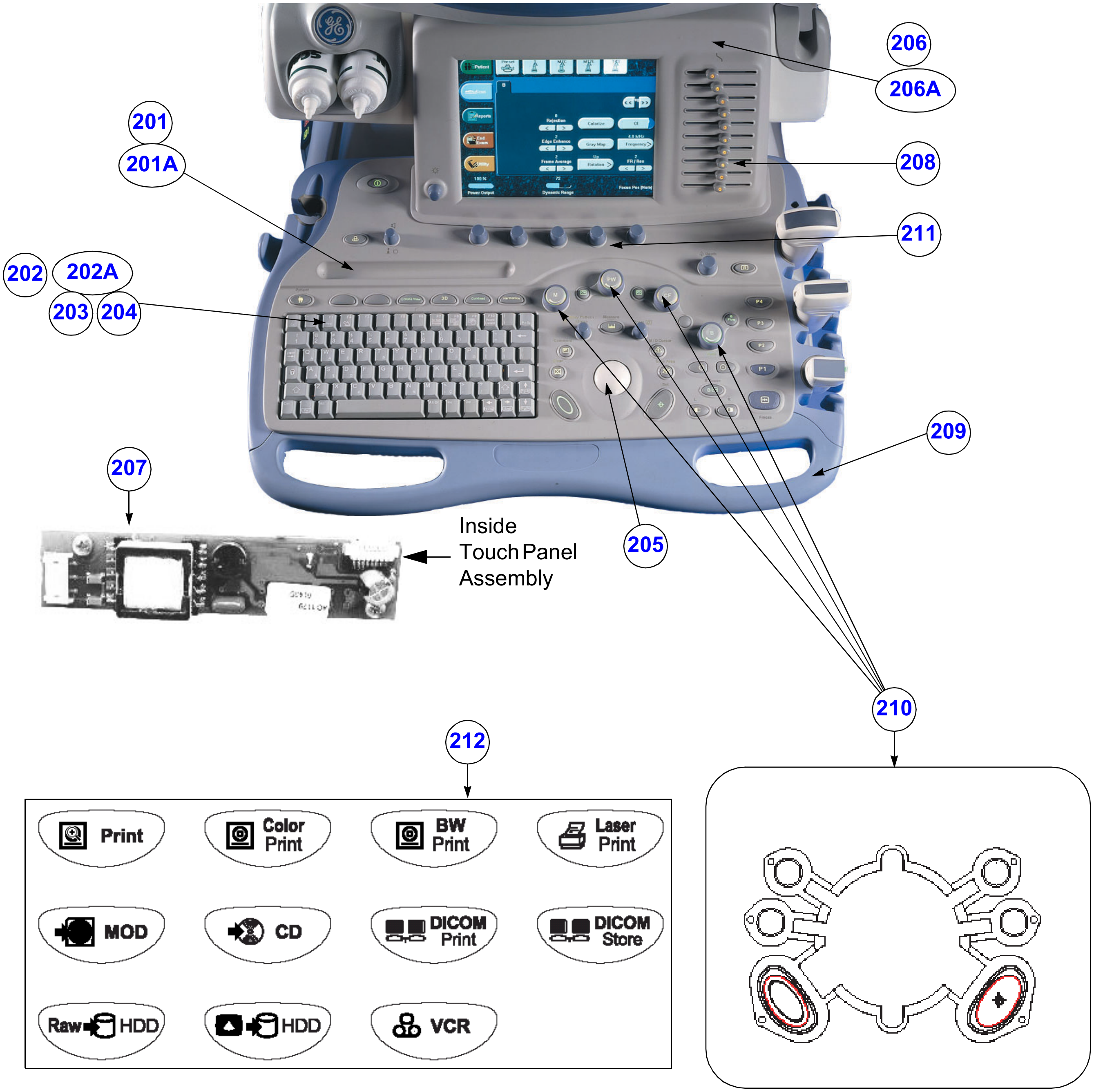


Figure 9-7 Operator Control Panel Assembly (Op I/O)

Table 9-10 Operator Control Panel Assembly

Item	Part Name	Part Number	Description	Qty	FRU
201	Lower Operator Panel Assembly	2188902-2	R3.X.X Software and above MUST USE 2188902-12 Will cross to 2188902-12 when stock is depleted	1	1
201A	Lower Operator Panel Assembly	2188902-12	With Standby. Backward compatible. R3.X.X Software and above MUST USE	1	1
202	A/N Keyboard - English	2188902-4	Alpha Numeric Keyboard R3.X.X Software and above MUST USE 2188902-14	1	1
202A	A/N Analog Keyboard - English	2188902-14	With Standby. Backward compatible. R3.X.X Software and above MUST USE this part	1	1
203	Russian A/N Keyboard	2188902-20	As required	1	1
204	Greek A/N Keyboard	2188902-21	As required	1	1
205	Trackball	2188902-5		1	1
206	Upper Operator Panel Assembly	2188902-3	Will cross to a 2188902-13 when stock is depleted.	1	1
206A	Upper Operator Panel Assembly	2188902-13		1	1
207	LCD Backlight Inverter	2188902-6		1	1
208	TGC PWA	2188902-7		1	1
209	Main Handle with Label	FB200131	Front Handle with Label	1	1
210	Operator Panel Mode select Knob Kit and Key Ring	2188902-8	Includes: 4 Mode select knobs (Inner & Outer pieces) and Key Ring	1	1
211	Universal Knob Kit	2384216	Contains all blue knobs for the LOGIQ 9 and Vivid 7		
212	Programmable Button Keytop Kit	2188902-9	Key caps for customer to customize the P1 - P4 key caps	1	1

Section 9-10
Monitor Assembly

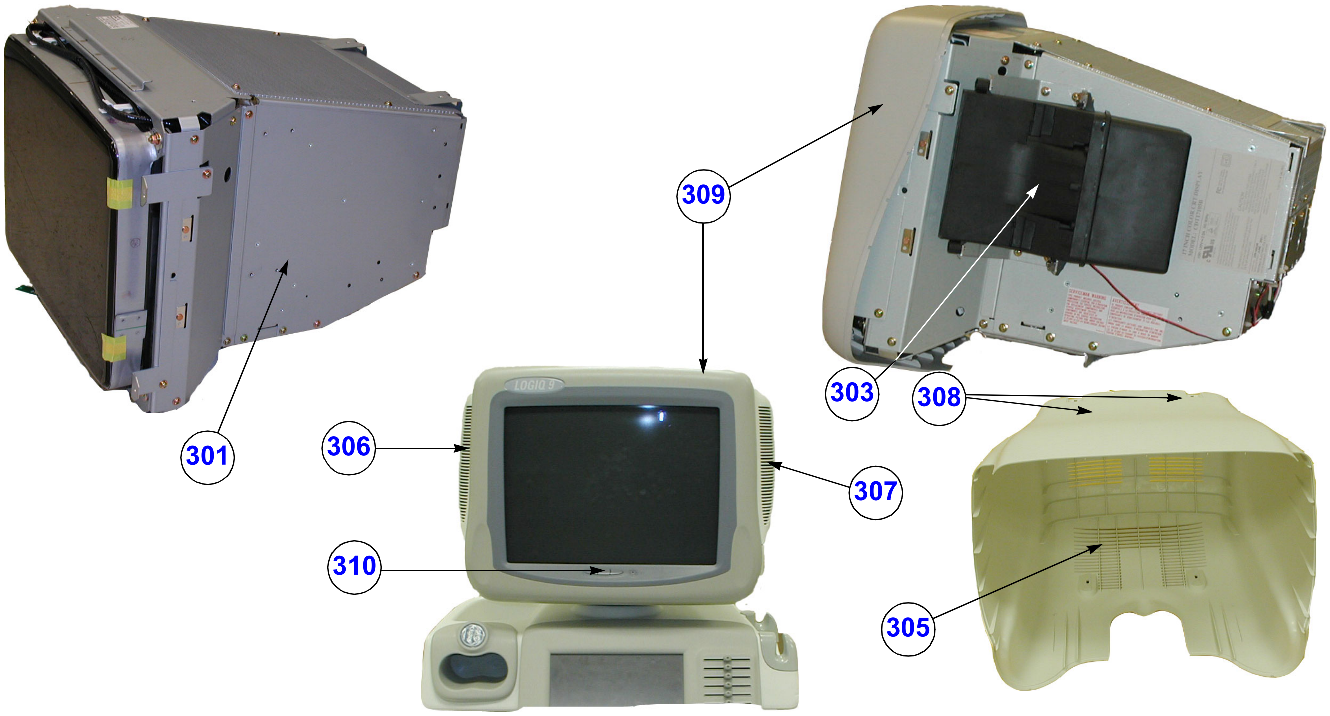


Figure 9-8 Monitor Assembly

Table 9-11 Monitor Assembly

Item	Part Name	Part Number	Description	Qty	FRU
301	Open Frame Monitor	2283334	*- Same as Vivid 7 & LOGIQ 7-*	1	1
302	Monitor Cable Assembly	2304171	*- Same as Vivid 7 & LOGIQ 7-*	1	2
303	Speaker and Mounting Bracket Kit	2297882		2	2
304	Monitor Tilt/Swivel/Male Post	2284225	Neck Assembly	1	2
305	Monitor Rear Cover Assembly	2303930	Assembly with Speaker Grills	1	2
306	Monitor Left Speaker Grill	2279675	Labeled as the LEFT Speaker Grill	1	2
307	Monitor Right Speaker Grill	2279676	Labeled as the RIGHT Speaker Grill	1	2
308	Monitor Screw Caps (covers)	2303932	Covers the screws on each side in the back of the cover - *Same as Vivid 7 & LOGIQ 7-*	2	2
309	Monitor Front Bezel Assembly	2303929	Includes three logos Vivid 7, LOGIQ 7 and LOGIQ 9	1	2
310	Monitor Switch Assembly	2297050	User Switch Assembly	1	2

Section 9-11
Front End Processor Assembly

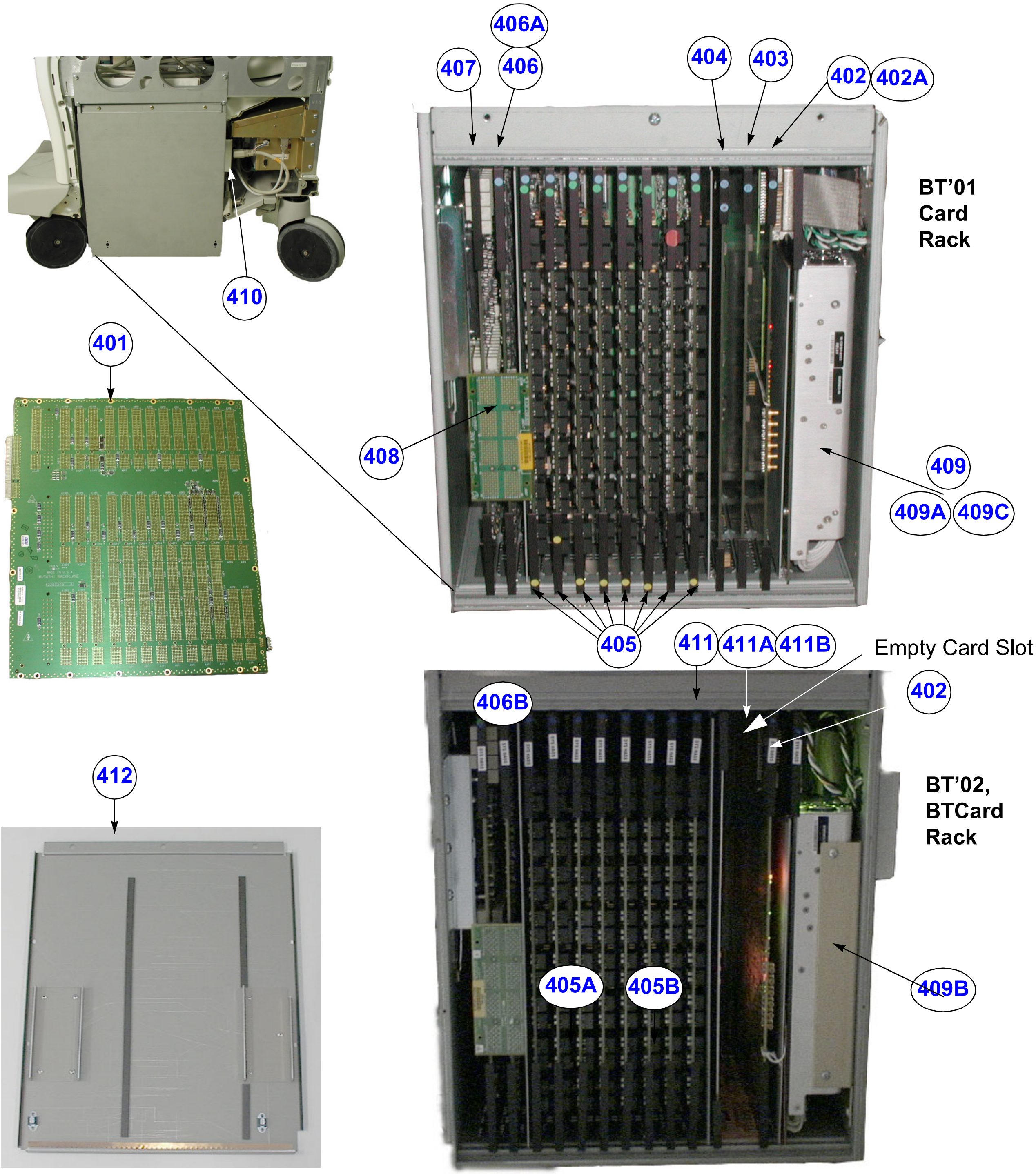


Figure 9-9 Front End Processor Assembly

Section 9-11 Front End Processor Assembly (cont'd)

Table 9-12 Front End Processor Assembly

Applications Software			R2.X.X		R3.X.X					
LOGIQ 9 Model Number			2188900-X (BT'01)	2351100-X (BT'02)	2375600-X (BT'03)	2188900-X (BT'03 upgrade)	2351100-X (BT'03 upgrade)			
Item	**Part Name**	**Part Number**						**Description**	**Qty**	**FRU**
401	Back Plane	2260219	X	X	X	X	X	Front End Back Plane	1	2
402	SCB1	2260214-2	X					Scan Control Board Use 2260214-3 if stock is depleted	1	1
402A	SCB1.1	2260214-3	X[1]	X				Scan Control Board - Required if using EBM Board	1	1
402B	SCB2	2365739			X	X	X	Has BT'03 Functionality	1	1
411	EBM	2273639-3	X[2]	X				Combined functions of EQ4 & BMP4. Positioned in the old EQ4 Slot. Needs SCB 2260214-3	1	1
411A	EBM1.8	2273639-5			X	X	X	EBM Board Upgraded to EBM2 functionality - Replace with EBM2	1	N
411B	EBM2	2273639-20			X	X	X	Has BT'03 Functionality	1	1
403	BMP4	2260207	X					B-Mode Processor	1	1
404	EQ4	2260210	X					Equalization Board	1	1
405	TD4	2260194-2	X	X		X	X	Transmit/Delay Board	8	1
405A	TD5	2362863			X			New power requirements different from TD4. Can not mix with TD4s. Requires FEPS3	8	1
405B	TD5.1	2386031			X			Same Function as TD5 but larger and fewer ASICs. You can mix TD5s and TD5.1s	8	1
406	RF AMP	2260212	X			X		Radio Frequency Amplifier Board Obsolete - Use 2341985-2	1	N
406A	RF AMP1.2	2341985-2	X[3]	X		X[3]	X	Design Improvement	1	1
406B	RF AMP2	2357621			X			New power requirements different from RF AMP1.X - Requires FEPS3	1	1
407	XDIF	2260221	X	X	X	X	X	Transmit Differential Board	1	1
408	Top Plane	2291656	X	X	X	X	X	Top Plane connects XDIF to RF Amp on front of cards	1	1
409	FEPS	2260203	X					Front End Power Supply - First Generation Obsolete When replaced with 2273641-3 or 2273641-4, requires replacement of the Front End Card Rack Cover in Kit 2374426	1	N

Table 9-12 Front End Processor Assembly

Applications Software			R2.X.X		R3.X.X					
LOGIQ 9 Model Number										
Item	Part Name	Part Number	2188900-X (BT'01)	2351100-X (BT'02)	2375600-X (BT'03)	2188900-X (BT'03 upgrade)	2351100-X (BT'03 upgrade)	Description	Qty	FRU
409A	FEPS2	2273641-3	X[4]	X				Second Generation FEPS Cross to a FEPS2.1 if stock is depleted May require Front End Card Rack cover kit 2374426 if replacing a 2260203 FEPS	1	1
409C	FEPS2.1	2273641-4	X[4]	X[5]		X	X	Second Generation with Standby Capabilities	1	1
409B	FEPS3	2376843			X			Analog Voltages are +/- 6V and 13V compared to +/-6v and 12V found in FEPS, FEPS2 and FEPS2.1 Must be used in systems with TD5.X and RF Amp2 (DO NOT use in R2.X.X systems or Systems upgraded to BT'03)	1	1
410	FEP AC Line Filter	2315960	X	X	X	X	X	Attached to side of FEP Card Rack	1	1
412	FEP Card Cage Front Cover Kit	2374426	X			X		Required if upgrading from FEPS to FEPS2/FEP2.1 Has additional shielding around Top Plane area and Power Supply areas. Labels included in kit to match FEP configuration	1	1

[1] SCB1 can be used on this model number also.

[2] EBM can be used on this model replacing the BMP4 and EQ4. However EBM requires SCB1.1 at a minimum.

[3] RF Amp1.2 can be used in this model number also.

[4] FEPS2 and FEPS2.1 can be used on this model number. However, must also use FEP Card Rack Cover Kit 2374426.

[5] FEPS2.1 can also be used on these model numbers

Section 9-12
I/O Interfaces

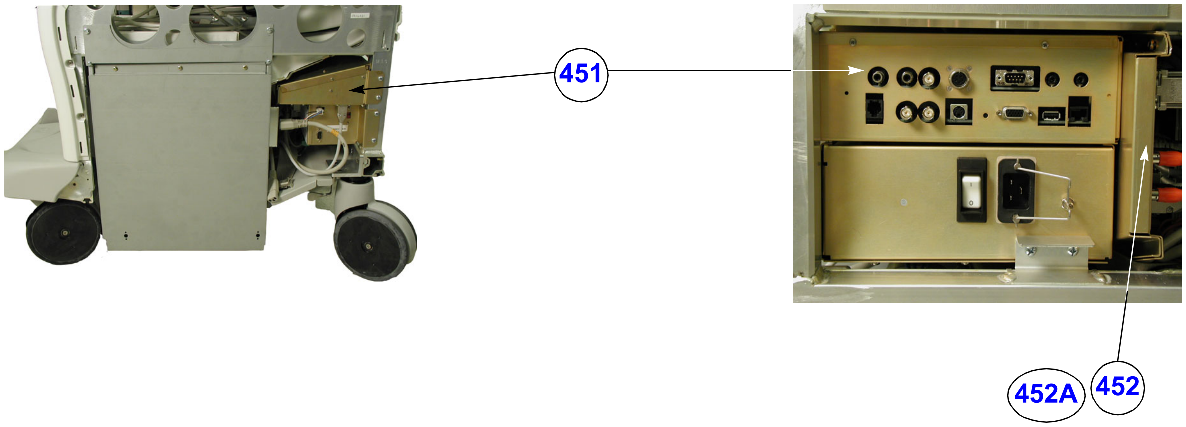


Figure 9-10 I/O Interfaces

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Table 9-13 I/O Interfaces

Item	Part Name	Part Number	Description	Qty	FRU
451	External I/O Assembly	FB200198	*- Same as Vivid 7 -*	1	1
452	Internal I/O Assembly	FB200197	*- Same as Vivid 7 -* Obsolete - Use FC200423	1	N
452A	Internal I/O Assembly	FC200423	*- Same as Vivid 7 -* Has gain increase for improved microphone performance	1	1

Section 9-13
Back End Processor Assembly

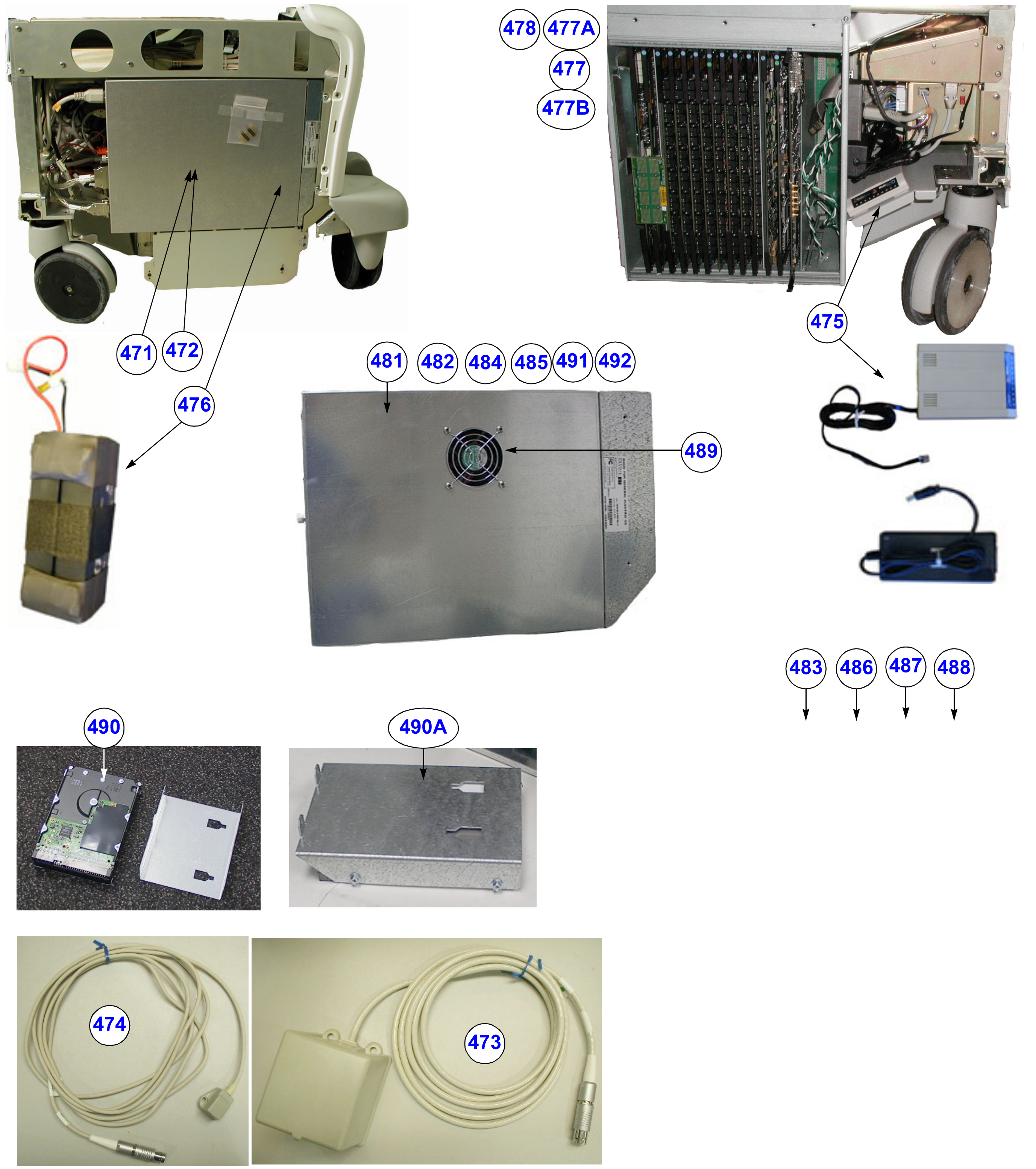


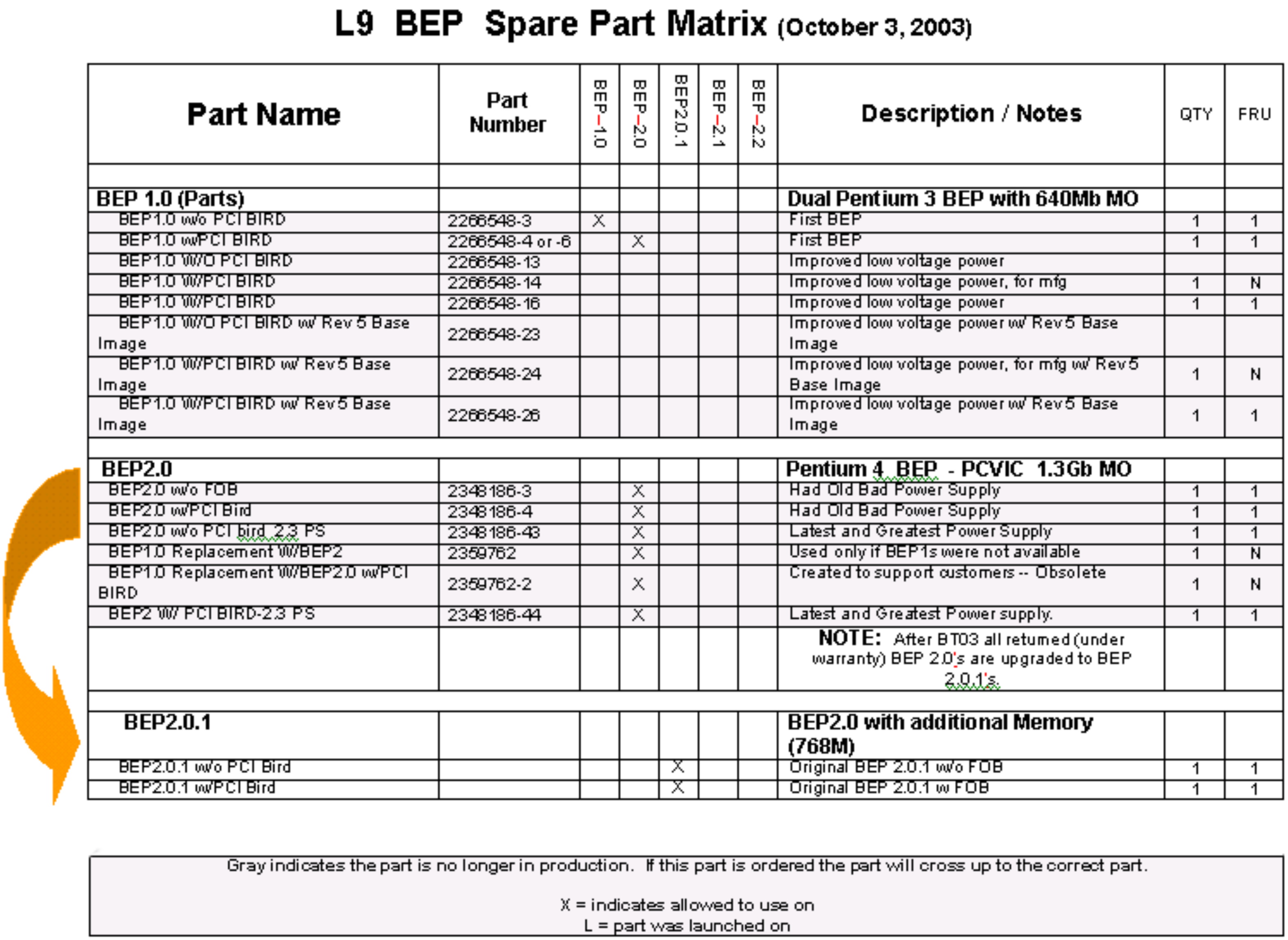
Figure 9-11 Back End Processor Assembly

Table 9-14 Back End Processor Assembly

Item	Part Name	Part Number	Description	Qty	FRU
471	Back End Processor (BEP1)	2266548-3	BEP1 - P3 Processor	1	1
472	Back End Processor (BEP1) w/ 3-D Option	2266548-4	P3 Processor with 3-D “Flock of Birds” option (PCI Bird Transmitter & Receiver NOT Included)	1	1
481	Back End Processor (BEP2.0)	2348186-3	P4 Processor	1	1
482	Back End Processor (BEP 2.0) w/ 3-D Option	2348186-4	P4 Processor with 3-D “Flock of Birds” option installed (PCI Bird Transmitter & Receiver NOT Included)	1	1
484	Back End Processor (BEP2.1)	2348186-13	P4 Processor with Digital VIC Card	1	1
485	Back End Processor (BEP 2.1) w/ 3-D Option	2348186-14	P4 Processor (Digital VIC Card) with 3-D “Flock of Birds” option installed (PCI Bird Transmitter & Receiver NOT Included)	1	1
491	Back End Processor (BEP2.2)	2348186-63	With Version 2.3 Power Supply	1	1
492	Back End Processor (BEP 2.2) w/ 3-D Option	2348186-64	With Version 2.3 Power Supply	1	1
483	Back End Processor Power Supply	2348186-38	Version 2.3 For ALL BEPs	1	1
473	3-D Externals - PCI Bird Transmitter	2301019-4	Option Kit	1	1
474	3-D Externals - PCI Bird Receiver	2301019-5	Option Kit	1	1
475	Global Modem Assembly	2245794	Multi-Tech - New installation requires cable kit #2358850 *-Same as Vivid 7 -*	1	1
476	BEP Battery Assembly	2266548-5	Computer UPS Battery, located inside BEP Assy. Expected battery life is 3 years *-Same as Vivid 7 -*	1	2
477	Base Image Load Software	2307061-xx *	Operating System Software - Specific to the BEP1.x.x	1	2
477A	Base Image Load Software	2352186-xx*	Operating System Software - Specific to the BEP2.x.x	1	2
477B	Base Image Load Software	2371612-2	Operating System Software - Specific to the BEP3.x.x	1	2
478	Applications Software	2307060-xx *	Ultrasound Operation Software, includes service platform and diagnostics	1	2
490	Hard Disk Drive (HDD) BEP 1	2366650	Will need to transfer mounting tray to new HDD	1	1
490A	Hard Disk Drive (HDD) BEP 2.x	2348186-31	Comes with bracket or mounting tray	1	1
486	CD-RW Drive	2348186-37	*BEP 2.x Only -Same as Vivid 7 -*	1	1
487	Patient I/O Module	2348186-22	*BEP 2.x Only -Same as Vivid 7 -*	1	1
488	MOD Drive	2348186-23	BEP 2.0 Only - 1.3 Gigabyte IDE - 3.5 inch	1	1
489	Fan	2348186-24	Mounted on BEP Chassis Cover *-Same as Vivid 7 -*	1	1

*NOTE: * Contact the OnLine Center. Provide the BEP Part Number, Serial Number and PSP Rev Level*

9-13-1 BEP Spare Parts Matrix



L9 BEP Spare Part Matrix (October 3, 2003)

Part Name	Part Number	BEP–1.0	BEP–2.0	BEP2.0.1	BEP–2.1	BEP–2.2	Description / Notes	QTY	FRU
BEP 1.0 (Parts)							**Dual Pentium 3 BEP with 640Mb MO**		
BEP1.0 w/o PCI BIRD	2266548-3	X					First BEP	1	1
BEP1.0 w/PCI BIRD	2266548-4 or -6		X				First BEP	1	1
BEP1.0 W/O PCI BIRD	2266548-13						Improved low voltage power		
BEP1.0 W/PCI BIRD	2266548-14						Improved low voltage power, for mfg	1	N
BEP1.0 W/PCI BIRD	2266548-16						Improved low voltage power	1	1
BEP1.0 W/O PCI BIRD w/ Rev 5 Base Image	2266548-23						Improved low voltage power w/ Rev 5 Base Image		
BEP1.0 W/PCI BIRD w/ Rev 5 Base Image	2266548-24						Improved low voltage power, for mfg w/ Rev 5 Base Image	1	N
BEP1.0 W/PCI BIRD w/ Rev 5 Base Image	2266548-26						Improved low voltage power w/ Rev 5 Base Image	1	1
BEP2.0							**Pentium 4 BEP - PCVIC 1.3Gb MO**		
BEP2.0 w/o FOB	2348186-3		X				Had Old Bad Power Supply	1	1
BEP2.0 w/PCI Bird	2348186-4		X				Had Old Bad Power Supply	1	1
BEP2.0 w/o PCI bird 2.3 PS	2348186-43		X				Latest and Greatest Power Supply	1	1
BEP1.0 Replacement W/BEP2	2359762		X				Used only if BEP1s were not available	1	N
BEP1.0 Replacement W/BEP2.0 w/PCI BIRD	2359762-2		X				Created to support customers -- Obsolete	1	N
BEP2 W/ PCI BIRD-2.3 PS	2348186-44		X				Latest and Greatest Power supply.	1	1
							NOTE: After BT03 all returned (under warranty) BEP 2.0's are upgraded to BEP 2.0.1's.		
BEP2.0.1							**BEP2.0 with additional Memory (768M)**		
BEP2.0.1 w/o PCI Bird				X			Original BEP 2.0.1 w/o FOB	1	1
BEP2.0.1 w/PCI Bird				X			Original BEP 2.0.1 w FOB	1	1

Gray indicates the part is no longer in production. If this part is ordered the part will cross up to the correct part.

X = indicates allowed to use on
L = part was launched on

Figure 9-12 BEP Spare Parts Matrix 1 of 3

BEP2.1							**Pentium 4 BEP - DGVIC 1.3Gb MO**		
BEP1.0 REPLACEMENT W BEP2.1	2359762-3				X		Kit to replace BEP 1	1	N
BEP2.1	2348186-13				X		Original BEP 2.1		
BEP2.1 W/O PCI BIRD-2.3 PS	2348186-53				X		BEP2.1 with improved power supply		
BEP2.1 W/O PCI BIRD-2.3 PS & no Base Image	2348186-57				X		BEP2.1 with improved power supply and no Base Image		
BEP1.0 Replacement w/BEP2.1 w/PCI BIRD	2359762-4				X		Kit to replace BEP1	1	N
BEP2.1 with PCI Bird	2348186-14				X		Original BEP 2.1 with PCI Bird		
BEP2.1 w PCI Bird 2.3 PS	2348186-54				X		BEP2.1 with with PCI Bird and improved power supply		
BEP2.1 W/ PCI BIRD-2.3 PS & no Base Image	2348186-58				X		BEP2.1 with PCI Bird and improved power supply and no Base Image		
							NOTE: After BT03 all returned (under warranty) BEP-2.1's are upgraded to BEP-2.2's.		
BEP2.2							**BEP 2.1 with additional Memory (768M)**		
BEP2.2 w/o PCI Bird - 2.3PS	2348186-63					X	Original BEP 2.2 without PCI Bird	1	1
BEP2.2 w/ PCI Bird - 2.3PS	2348186-64					X	Original BEP 2.2 with PCI Bird	1	1
Power Supplies							**300W ATX Supply with UPS**		
BEP2 Power Supply	2348186-20	L					Problem with low line voltage – NLIP	1	0
BEP2 POWER SUPPLY	2348186-32		L				Problem with high line voltage – NLIP	1	0
BEP2 POWER SUPPLY Rev. 2.3	2348186-38	X	X	X	X	X	Fixed Power Supply	1	1
CD									
CD RW DRIVE	2348186-21		L	?	X	X	Original Plextor FRU	1	1
CD-RW DRIVE W/BRKT & SW & INST	2348186-37	X	X	X	X	X	Install Kit and bracket are needed to load onto a V7 systems. Sony drive works in L9 without installing the included software.	1	1
MO									
MOD DRIVE 1.3G CAPACITY IDE	2348186-23		L	X	X	X		1	1
Hard Drive									
HDD for BEP1.0	2366650	X					20 or 40G used on BEP1.0 (*only 20G of usable space*)	1	1
HDD for BEP2.X w/brackets	2348186-31		L	X	X	X	40G HD for use on all BEP-2.x	1	1

Gray indicates the part is no longer in production. If this part is ordered the part will cross up to the correct part.

X = indicates allowed to use on
L = part was launched on

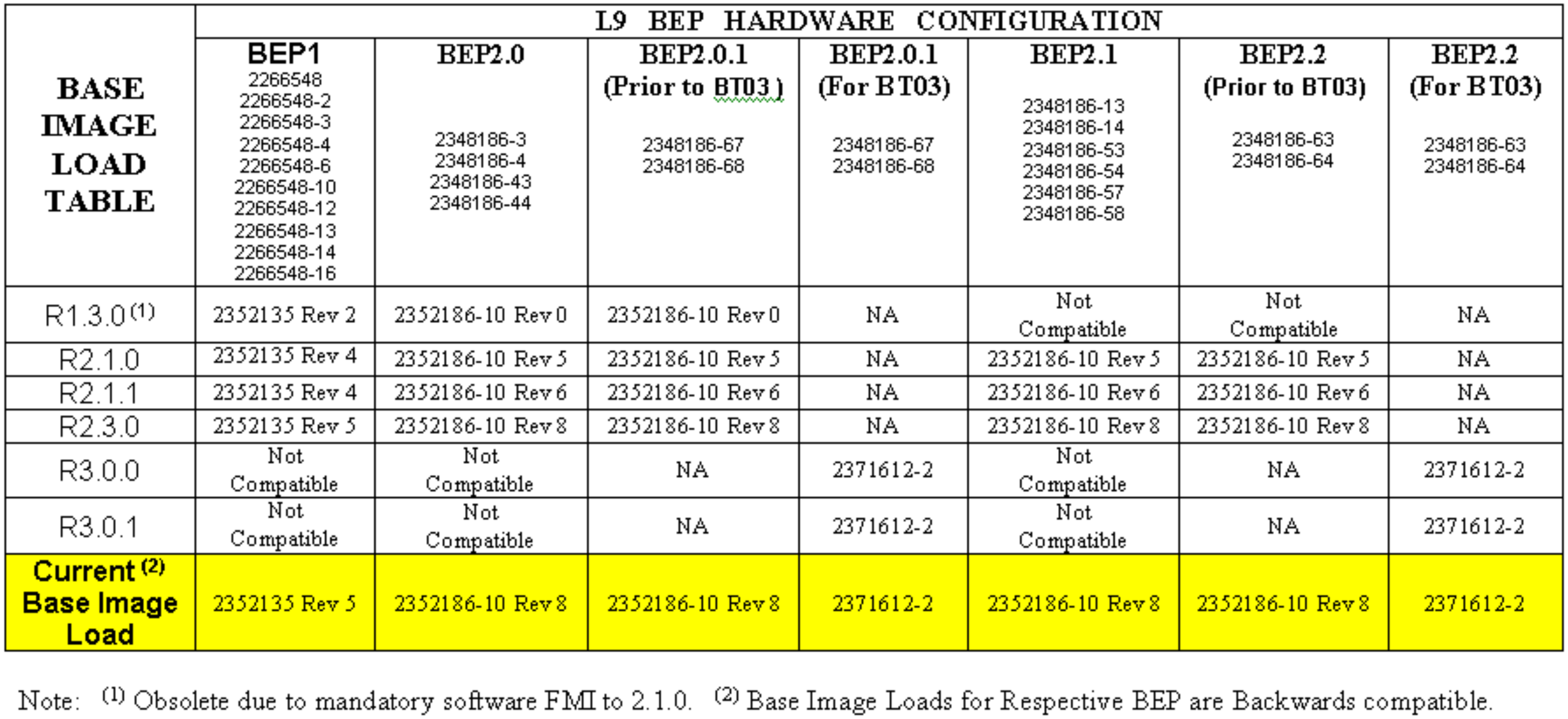
Figure 9-13 BEP Spare Parts Matrix 2 of 3

Battery Assembly									
BEP UPS Battery	2266548-5	X	X	X	X	X		1	1
Patient IO Mod									
PATIENT IO MODULE	2348186-22		L	X	X	X		1	1
Miscellaneous									
FAN FOR BACK END PROCESSOR	2348186-25		L	X	X	X		1	1
USB TO RS232 ADAPTER CABLE	2348186-26		L				Does not support Standby -- Obsolete	1	0
USB TO RS232 ADAPTER CABLE (BLACK)	2364642		X	X	X	X	Supports Standby	1	1

Gray indicates the part is no longer in production. If this part is ordered the part will cross up to the correct part.

X = indicates allowed to use on
L = part was launched on

Figure 9-14 BEP Spare Parts Matrix 3 of 3



BASE IMAGE LOAD TABLE	L9 BEP HARDWARE CONFIGURATION						
	BEP1 2266548 2266548-2 2266548-3 2266548-4 2266548-6 2266548-10 2266548-12 2266548-13 2266548-14 2266548-16	**BEP2.0** 2348186-3 2348186-4 2348186-43 2348186-44	**BEP2.0.1 (Prior to BT03)** 2348186-67 2348186-68	**BEP2.0.1 (For BT03)** 2348186-67 2348186-68	**BEP2.1** 2348186-13 2348186-14 2348186-53 2348186-54 2348186-57 2348186-58	**BEP2.2 (Prior to BT03)** 2348186-63 2348186-64	**BEP2.2 (For BT03)** 2348186-63 2348186-64
R1.3.0 (1)	2352135 Rev 2	2352186-10 Rev 0	2352186-10 Rev 0	NA	Not Compatible	Not Compatible	NA
R2.1.0	2352135 Rev 4	2352186-10 Rev 5	2352186-10 Rev 5	NA	2352186-10 Rev 5	2352186-10 Rev 5	NA
R2.1.1	2352135 Rev 4	2352186-10 Rev 6	2352186-10 Rev 6	NA	2352186-10 Rev 6	2352186-10 Rev 6	NA
R2.3.0	2352135 Rev 5	2352186-10 Rev 8	2352186-10 Rev 8	NA	2352186-10 Rev 8	2352186-10 Rev 8	NA
R3.0.0	Not Compatible	Not Compatible	NA	2371612-2	Not Compatible	NA	2371612-2
R3.0.1	Not Compatible	Not Compatible	NA	2371612-2	Not Compatible	NA	2371612-2
Current (2) Base Image Load	2352135 Rev 5	2352186-10 Rev 8	2352186-10 Rev 8	2371612-2	2352186-10 Rev 8	2352186-10 Rev 8	2371612-2

Note: (1) Obsolete due to mandatory software FMI to 2.1.0. (2) Base Image Loads for Respective BEP are Backwards compatible.

Figure 9-15 BEP Base Image Load Matrix

Section 9-14
Interconnect Cables

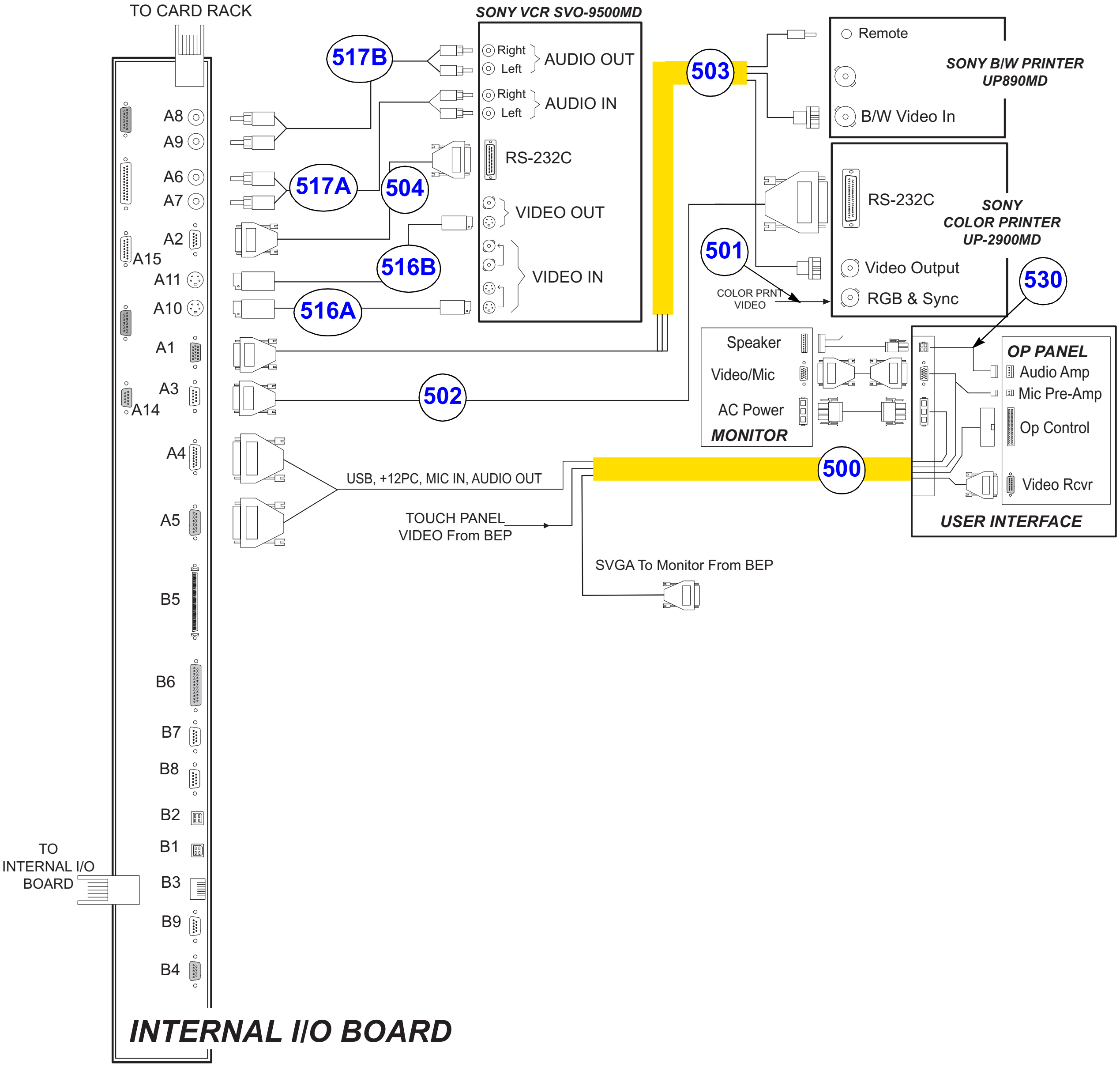


Figure 9-16 Peripheral Cable Diagram

Table 9-15 Peripheral Cables

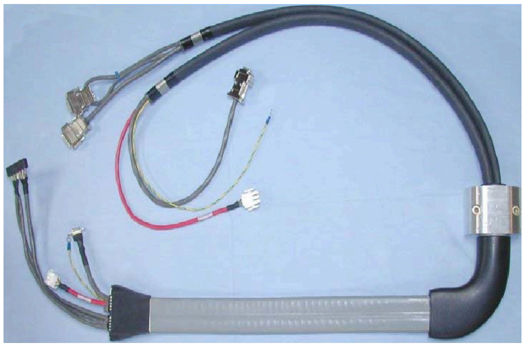
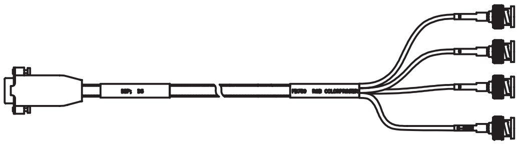
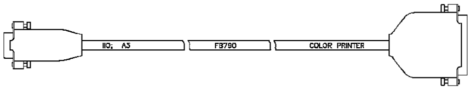
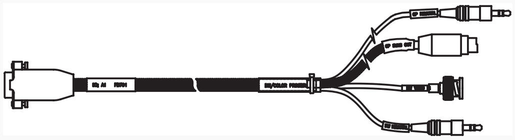
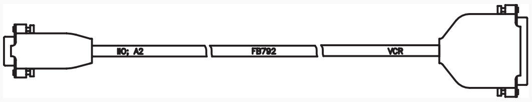
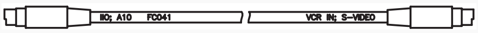
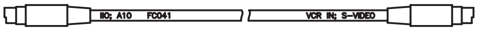
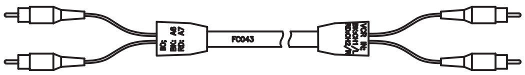
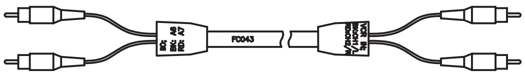
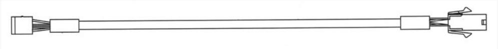
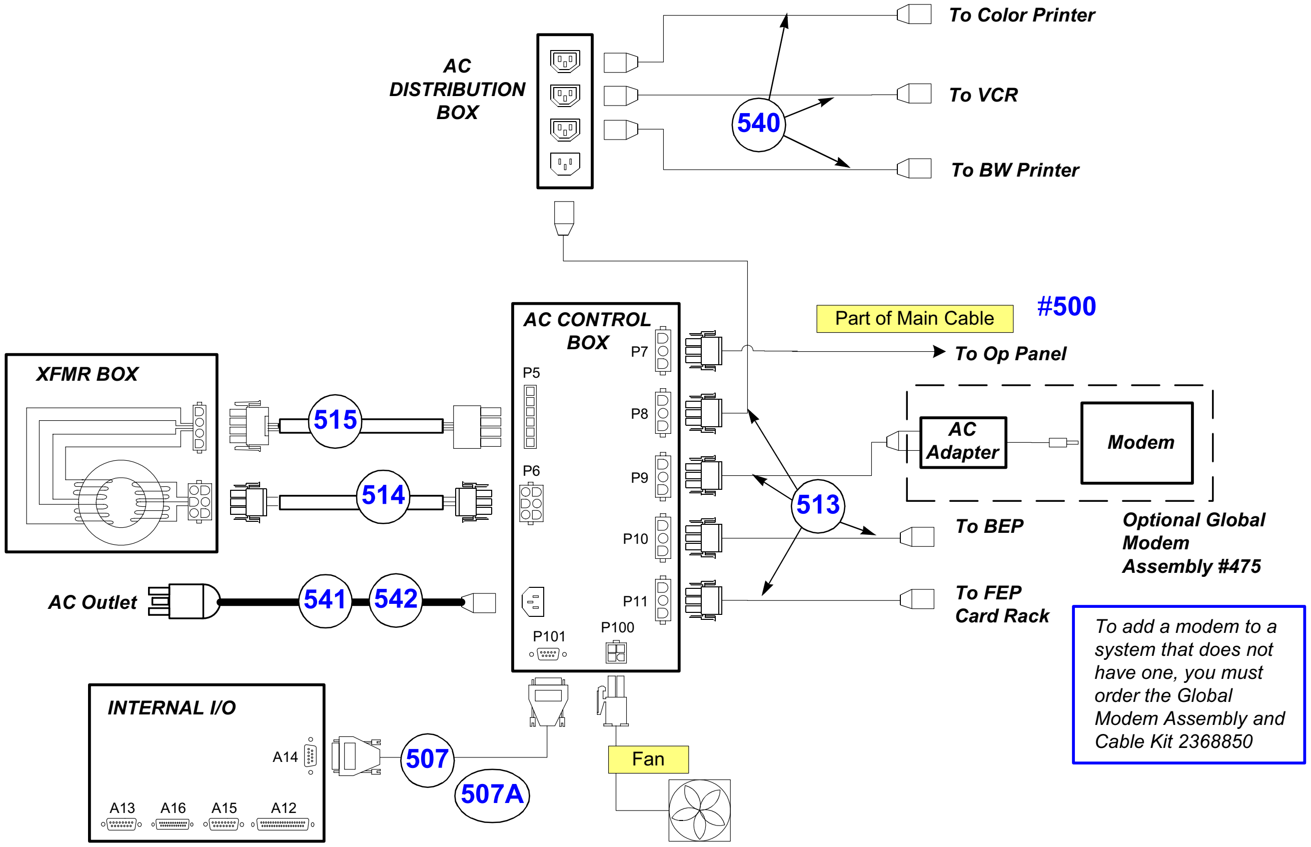
Item	Part Name	Part Number	Description	Qty	FRU
500	Console Cable Assembly (complete)	FB200320	Top Console and Monitor to IIO, AC Ctrl, BEP and Gas spring - *Same as Vivid 7 -* 	1	1
501	Color Printer Video Cable	FB200789	RGB & Sync From PCVIC to Color Printer - #1 -BEP-D5 to RGB Color Printer - *Same as Vivid 7 -* 	1	1
502	Color Printer Control Cable	FB200790	#2 - *Same as Vivid 7 -* 	1	1
503	BW/CP Printer Cable	FB200791	#3 - IIO-A1 to BW/Color Printer - *Same as Vivid 7 -* 	1	1
504	VCR Remote Control Cable	FB200792	#4 - IIO-A2 to VCR - *Same as Vivid 7 -* 	1	1
516A	SVHS Cable, Shielded	FC200041	#16 - IIO-A10 to VCR IN - *Same as Vivid 7 -* 	2	1

Table 9-15 Peripheral Cables

Item	Part Name	Part Number	Description	Qty	FRU
516B	SVHS Cable, Shielded	FC200042	#16 - IIO-A10 to VCR Out- *Same as Vivid 7 -*  	2	1
517A	Audio Cable, Shielded	FC200043	#17 - IIO-A6/A7 to VCR IN CH1(L)/CH2(R) *- Same as Vivid 7 -*  	2	1
517B	Audio Cable, Shielded	FC200044	#17 - IIO-A6/A7 to VCR OutCH1(L)/CH2(R) *- Same as Vivid 7 -*  	2	1
530	Speaker Cable - Bulkhead	2319024		1	1



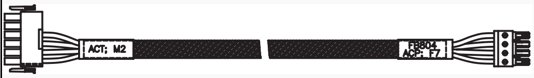
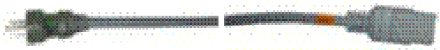
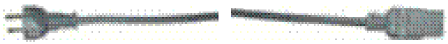
To add a modem to a system that does not have one, you must order the Global Modem Assembly and Cable Kit 2368850

Figure 9-17 AC Distribution Cable Diagram

Table 9-16   AC Distribution Cables

Item	Part Name	Part Number	Description	Qty	FRU
507	Fan Speed Control Cable	FB200795	#7 - IIO-A15 to ACP-F8 	1	1
507A	Fan Speed Control Cable if EQ4 PWA (2260210) is Rev K or earlier	2333827	#7 - IIO-A15 to ACP-F8 	1	1
513	AC-Distribution Cable Kit	FB200802	Includes FB200802-1, FB200802-2, FB200802-3 & FB200802-4	1	1
514	AC Mains 1 Cable	FB200803	#14 - ACT-M1 to ACP-F6 - *Same as Vivid 7 -* 	1	1

Table 9-16 AC Distribution Cables

Item	Part Name	Part Number	Description	Qty	FRU
515	AC Mains 2 Cable	FB200804	#15 - ACT-M2 to ACP-F7 - *Same as Vivid 7 -* 	1	1
540	AC Peripheral Cable	070C5080	AC to Color & B/W Printers and VCR	3	1
541	AC Power Cord - USA	2162856		1	1
542	AC Power Cord - Outside USA	2118615		1	1

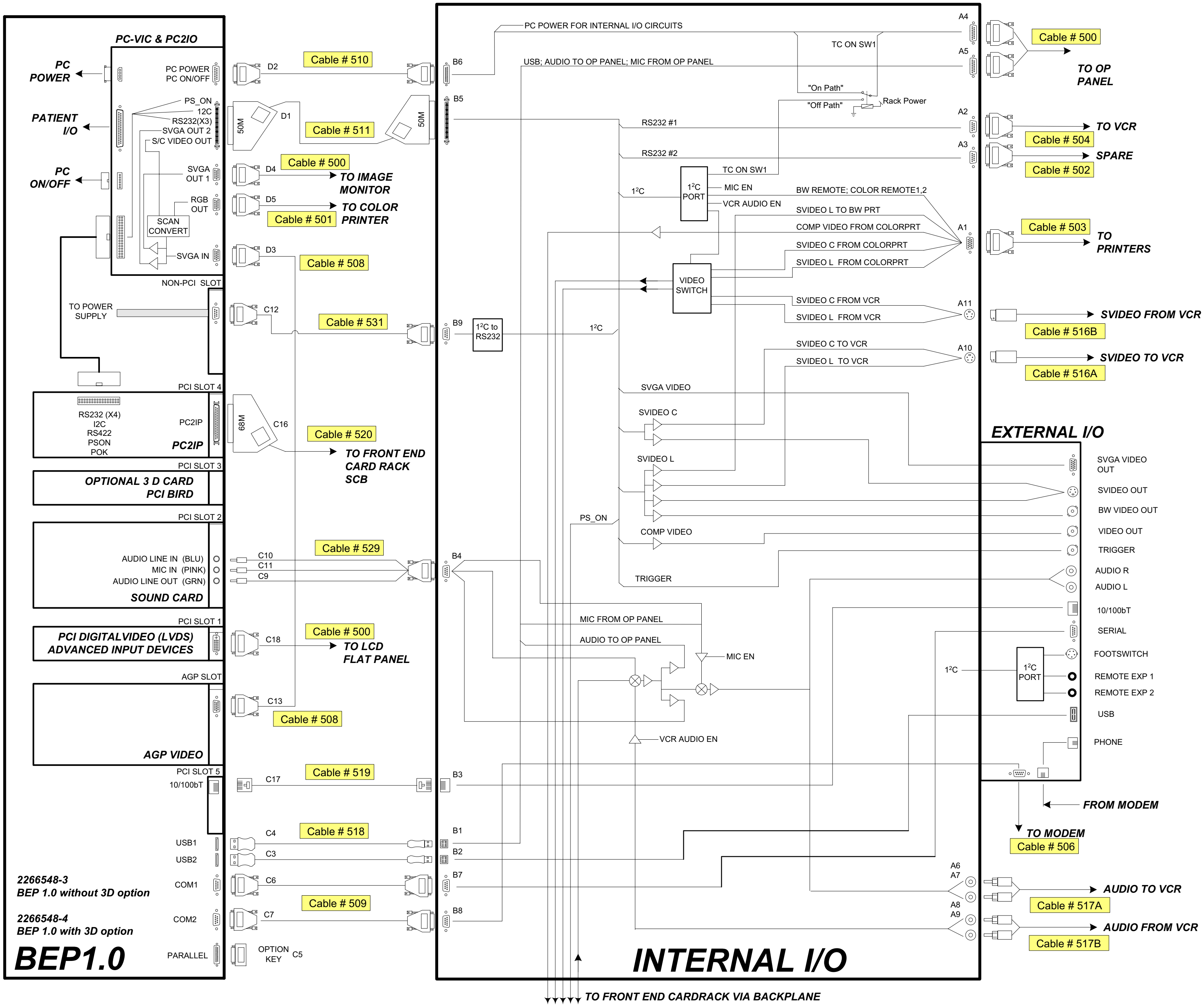


Figure 9-18 BEP 1.0 and II/O Cabling Diagram

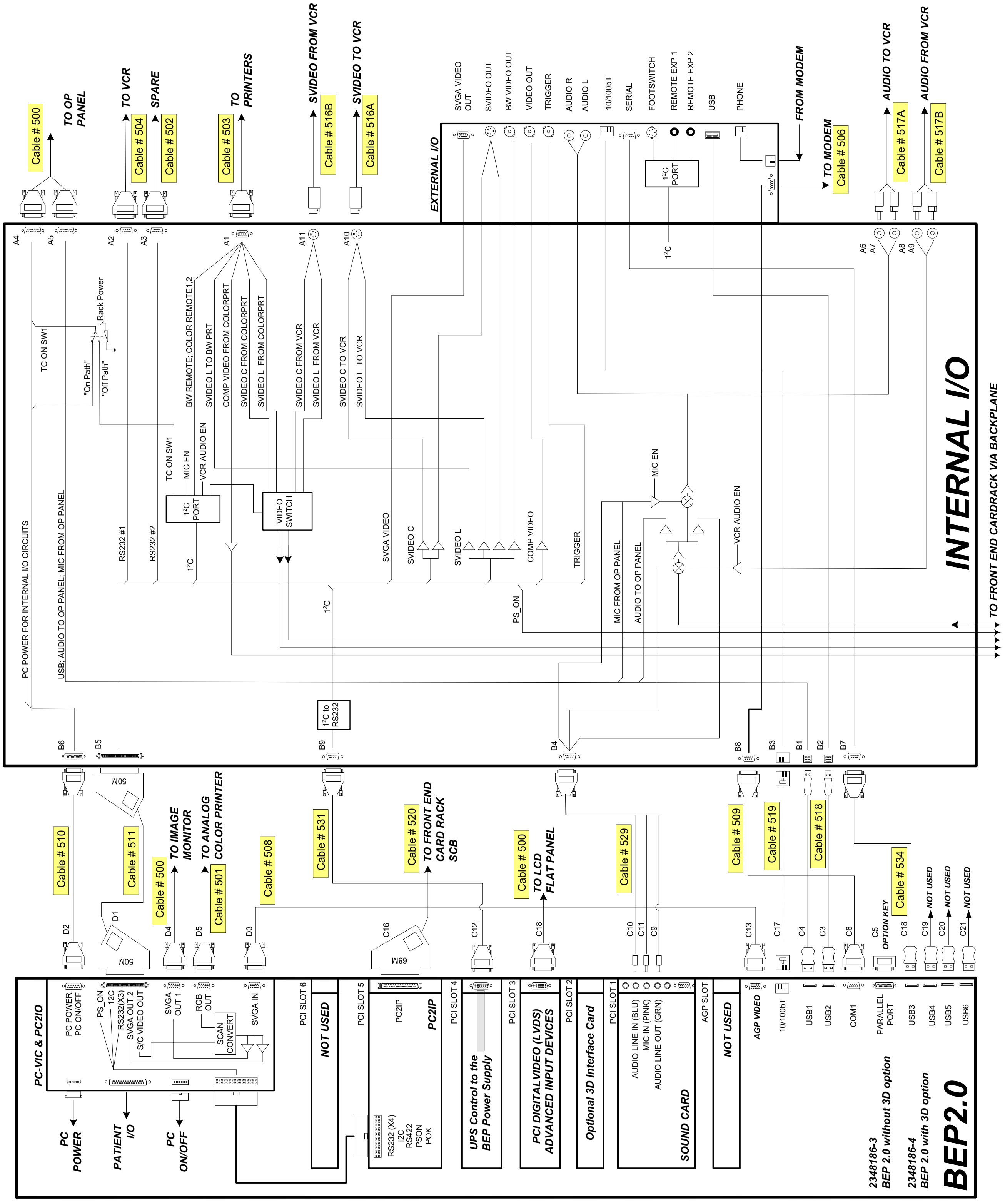


Figure 9-19 BEP 2.0 and II/O Cabling Diagram

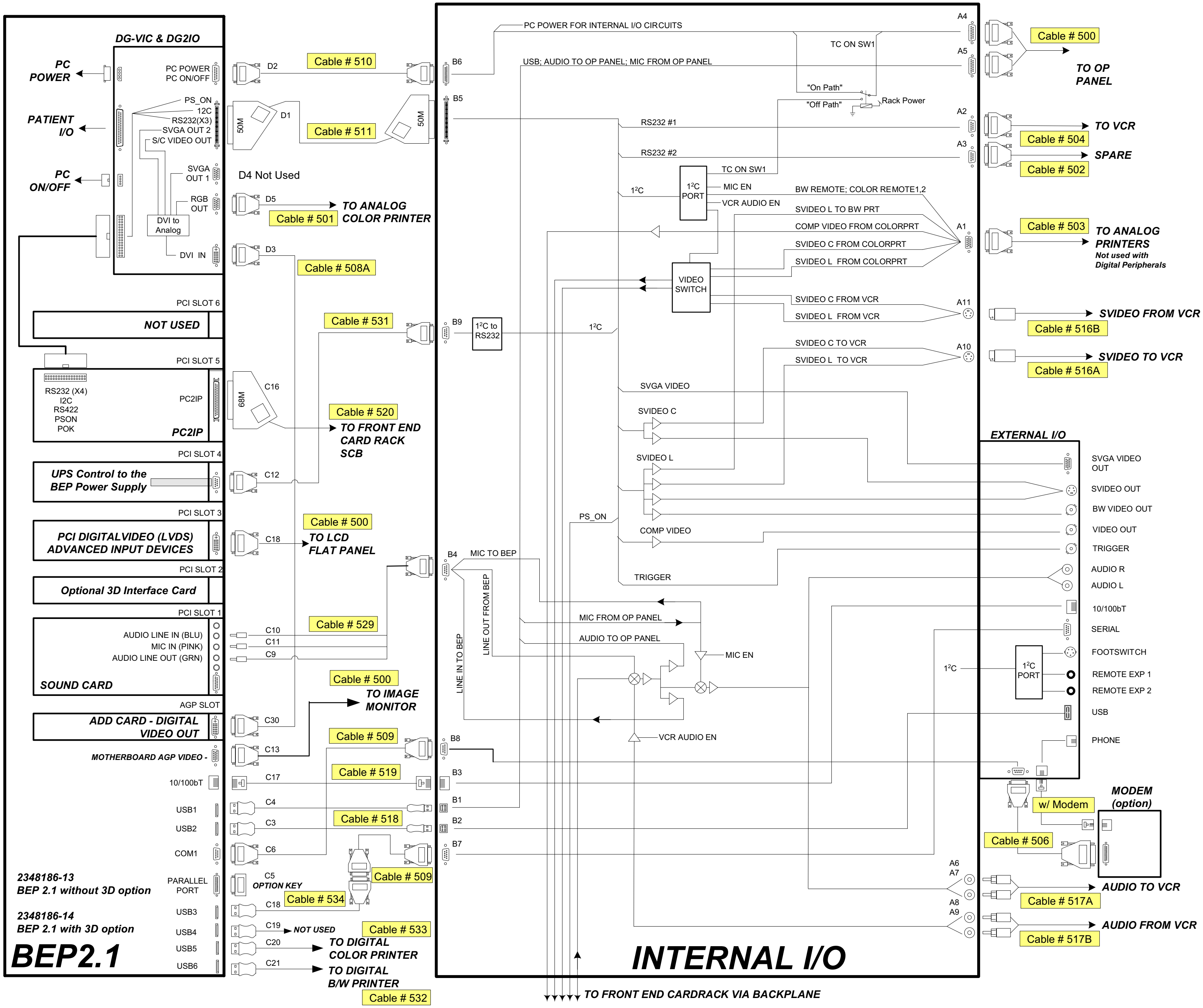


Figure 9-20 BEP 2.1/2.2 and II/O Cabling Diagram

Table 9-17 Internal I/O Cables

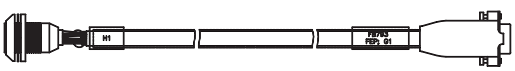
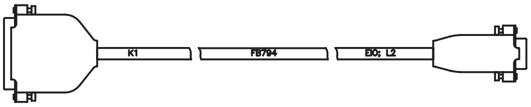
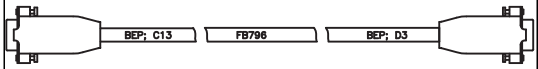
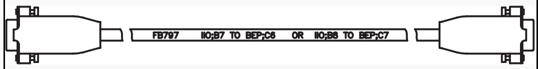
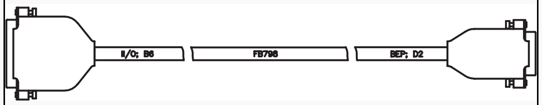
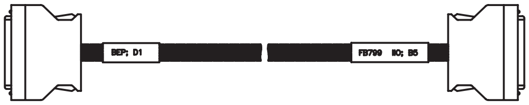
Item	Part Name	Part Number	Description	Qty	FRU
505	Doppler Cable	FB200793	From Front Panel to Front End Processor - #5  	1	1
506	Standard Modem Cable	FB200794	From Modem to External I/O - #6 Packaged with FB200802-1 (modem power cable) and used with Modem Option kit  	1	1
508	Monitor Cable Standard	FB200796	BEP AGP Video to PCVIC Card SVGA - #8 - BEP-C13 to BEP-D3 - *Same as Vivid 7 -*  	1	1
508A	Digital Video Interface Cable	2354056	Interface from AGP Slot ADD card to DGVIC BEP 2.1	1	1
509	RS232 Com 1/2 Cable	FB200797	#9 - IIO-B7 to BEP-C6 or IIO-B8 to BEP-C7 Used with 2364642 in BEP 2.x Systems *- Same as Vivid 7 -*  	2	1
510	Internal I/O-PC2IO Power/Control Cable	FB200798	#10 - IIO-B6 to BEP-D2 - *Same as Vivid 7 -*  	1	1
511	Internal I/O-PC2IO Signals Cable	FB200799	#11 - Obsolete Use FC200286-	1	N
511A	Internal I/O-PC2IO Signals Cable	FC200286	 #11A BEP D1 to IIO B5 *Same as Vivid 7 -* Improved flex and length	1	1
518	USB A-B Cable	070D2802	#18 - *Same as Vivid 7 -* 	2	1

Table 9-17 Internal I/O Cables

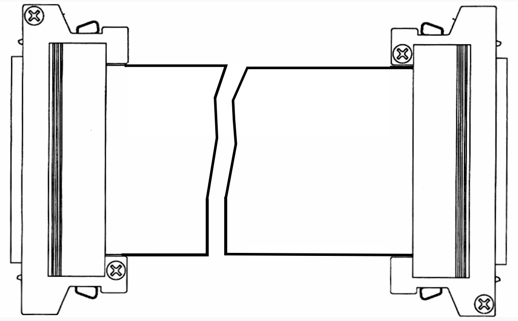
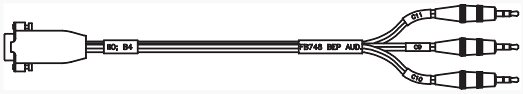
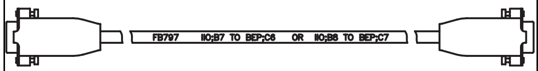
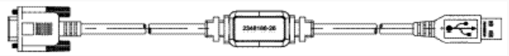
Item	Part Name	Part Number	Description	Qty	FRU
519	Ethernet Cat-5 Cable	070D2902	#19 - *Same as Vivid 7 -* 	1	1
520	PCI Cable, AMP 974298	070M0016	PCI Bus Extension Cable BEP to FEP - #20 *- Same as Vivid 7 -* 	1	1
529	Internal I/O-PC Audio Cable	FB200748	#29 - IIO-B4 to BEP-AUD - *Same as Vivid 7 -* 	1	1
531	UPS Control Cable	FC200016		1	1
532	Digital B/W Printer Cable	2363062	From USB #6 to Digital B/W Printer - BEP 2.1 Straight USB, gray in color	1	1
533	Digital Color Printer Cable		From USB #5 to Digital Color Printer (USB to SCSI) BEP 2.1, Right angle USB, black in color	1	1
534	USB to Serial Adapter Cable	2348186-26	From USB #3 To Serial Cable To Internal I/O B7 - Obsolete Use 2364642 and FB200797 	1	1

Table 9-17 Internal I/O Cables

Item	Part Name	Part Number	Description	Qty	FRU
534A	USB to Serial Adapter Cable	2364642	From USB #3 To Serial Cable FB200797 To Internal I/O B7 (Ext I/O Com Port) BEP 2.0 & 2.1 	1	1
535	USB to SCSI Adapter	2354406	From USB to SCSI for Sony UP-D50 input	1	1

Section 9-15
Power Distribution

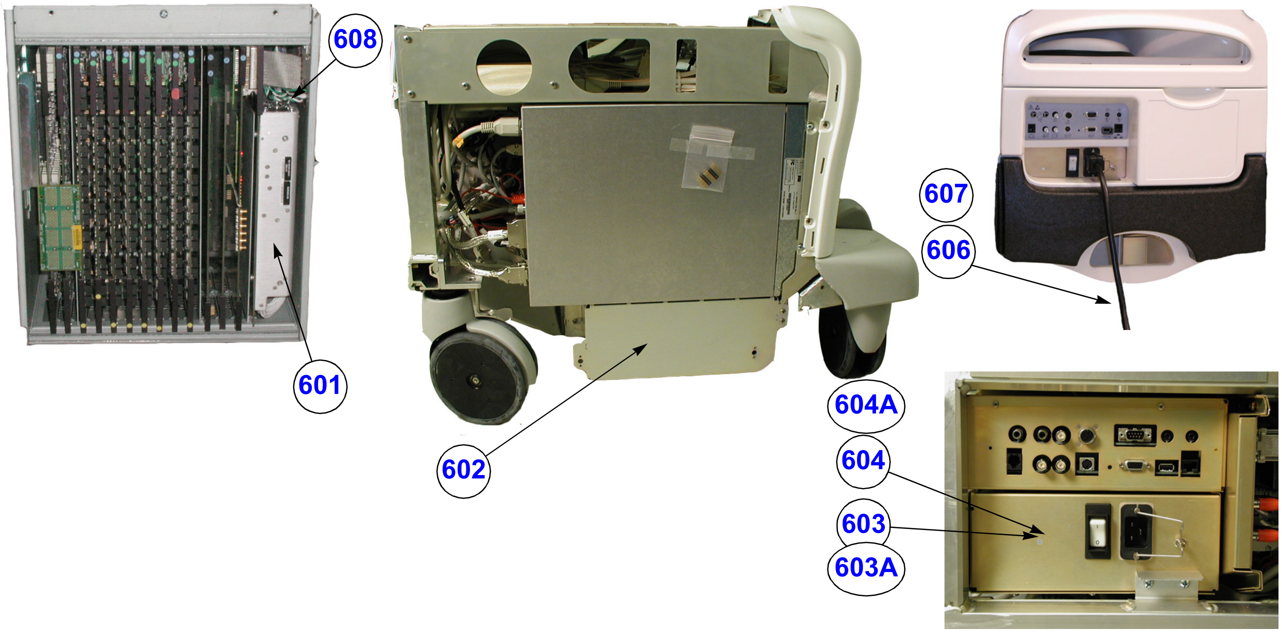
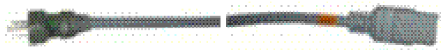
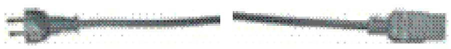


Figure 9-21 Power Distribution

Table 9-18 Power Distribution

Item	Part Name	Part Number	Description	Qty	FRU
601	Card Rack Power Supply PWA Assembly (FEPS)	2260203	Power Supplies are mounted on the circuit board	1	1
602	AC Transformer Assembly	FB200581	*- Same as Vivid 7 -*	1	2
603	AC CTRL ASSY, 100-120 V	FC200079	100-120 VAC Systems - *Same as Vivid 7* *Obsolete Use FC200403*	1	N
603A	AC CTRL ASSY, 100-120 V	FC200403	100-120 VAC Systems - *Same as Vivid 7*	1	1
604	AC CTRL ASSY, 220-240 V	FC200081	220-240 VAC Systems - *Same as Vivid 7* *Obsolete Use FC200404*	1	N
604A	AC CTRL ASSY, 220-240 V	FC200404	220-240 VAC Systems - *Same as Vivid 7*	1	1
606	Power Cord 110Vac	2286301	*USA and Japan* 	1	1
607	Power Cord 220-240 Vac	2218615		1	1
608	AC Power Harness	2315960	Line Filter and Power Harness to FEPS	1	1

Section 9-16
Air Distribution

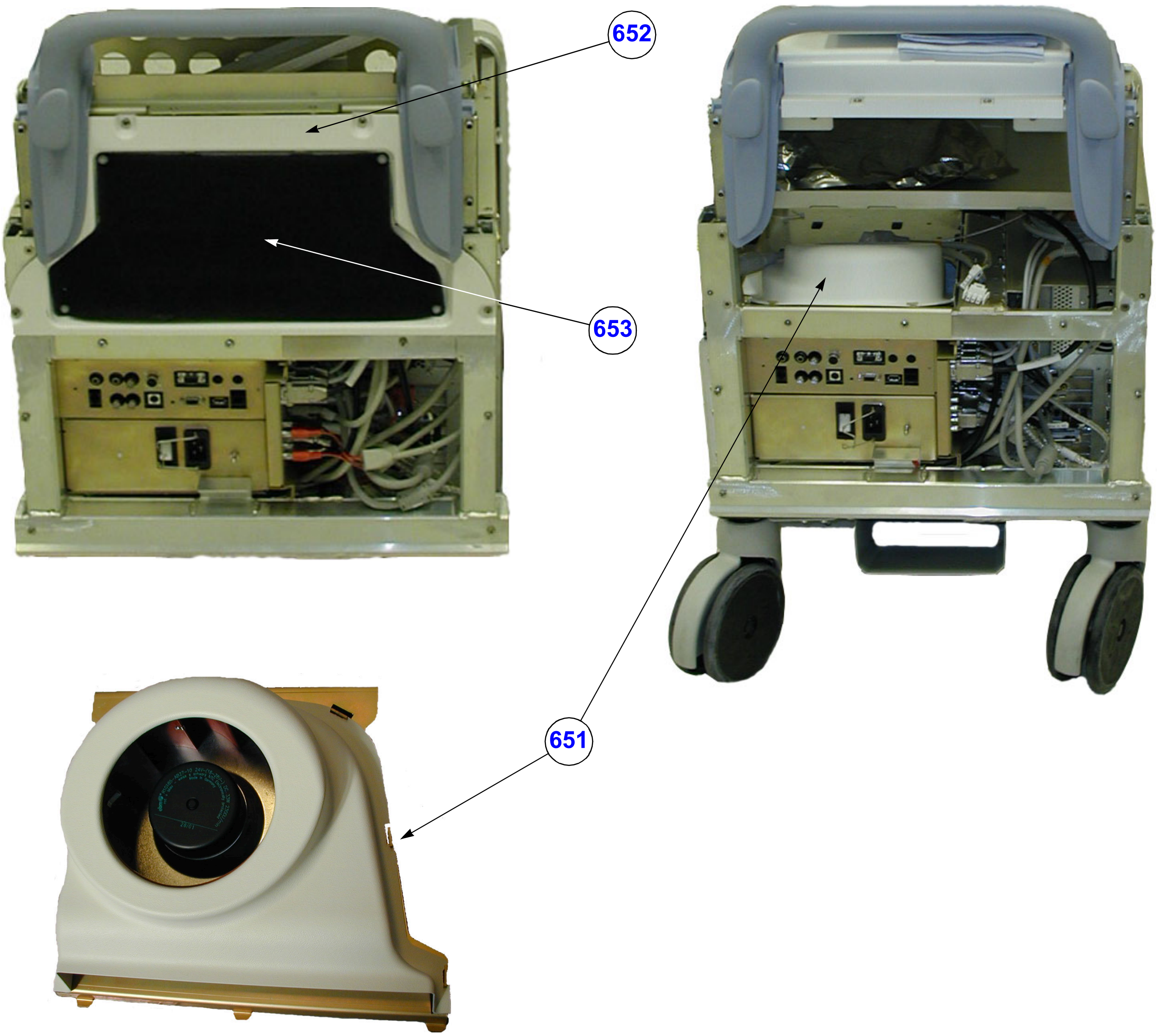


Figure 9-22 Air Distribution Parts

Table 9-19 Air Distribution Parts

Item	Part Name	Part Number	Description	Qty	FRU
651	Fan Assembly	FB200580	*- Same as Vivid 7 -*	1	1
652	Air Intake Cover	FB307379	*- Same as Vivid 7 -*	1	1
653	Filter	FB307903	*- Same as Vivid 7 -*	1	1

Section 9-17
Peripherals

Figure 9-23 Peripherals

Table 9-20 Approved Peripherals

Item	Part Name	Part Number	Description	Qty	FRU
700	Sony VCR 9500 M2D	2117635 (T3306ER)	H4700TC	1	2
700A	Sony VCR 9500	E10031AC	PAL Version (Europe)		
701	Sony 2900 Color Video Printer	2207254 (T3306PT)	H4700TD	1	2
701A	Sony 2900 Color Video Printer	ECat	European Replacement		
702	Sony Color Printer UP51MD	2281966	H4700TH	1	2
702A	Sony Color Printer UP51MD	ECat	European Replacement		
703	Sony B/W Video Printer UP895MD	2288502	E8210B	1	2
704	Inkjet Page printer	2301163	H4700PL	1	2
704A	Inkjet Page printer	ECat	European Replacement		
705	3 Position Footswitch	FB200723	HK45011AK - *Same as Vivid 7 -*	1	2
706	Sony UP-D895MD	2358588	Digital B/W Printer	1	2
707	Sony UP-D50MD	2358596	Digital Color Printer	1	
	Sony UP-D21MD	2351318	Digital Color Printer (small footprint)	1	
	Sony UP-21MD	2358449	Analog Color Printer (small footprint)	1	
	Sony UP-21 & D21 Adapter kit	2351082	Mounting plate, cover tray and screws	1	

Section 9-18
Voice Scan

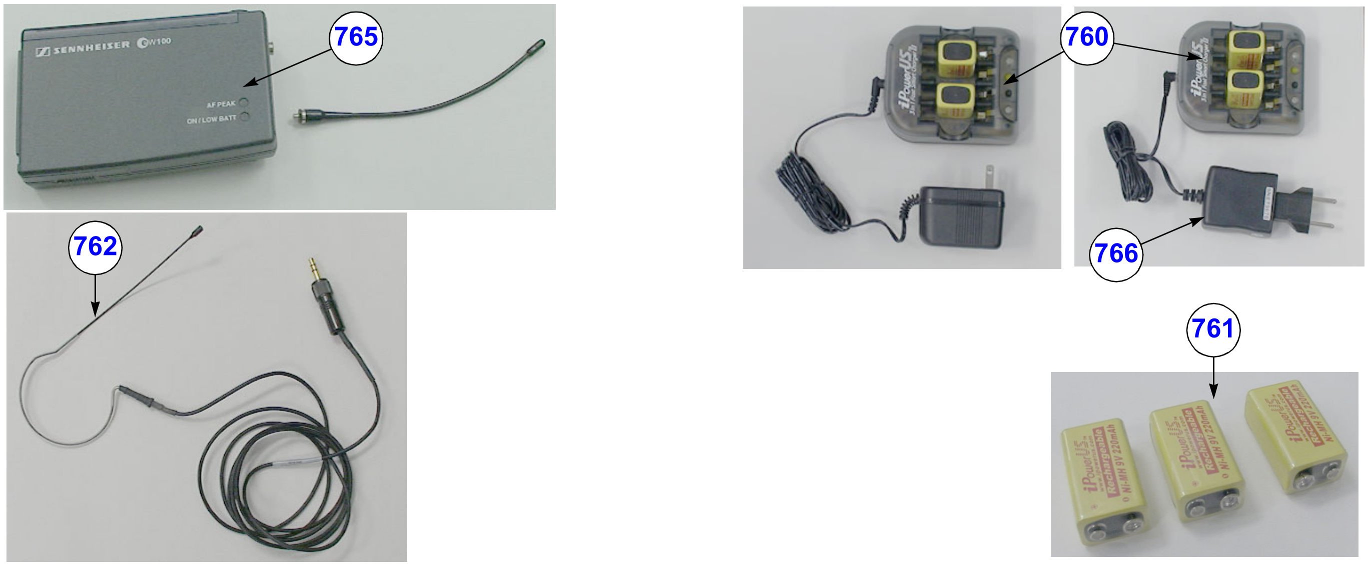


Figure 9-24 Voice Scan Replacement Parts

Table 9-21 Voice Scan

Item	Part Name	Part Number	Description	Qty	FRU
750	Wireless Receiver	2383770		1	1
751	Battery Eliminator Cable	2383769		1	1
752	Audio to USB Adapter	2383765		1	1
753	Audio Cable from Receiver	2383768		1	1
754	Power Cable for Receiver	2383767		1	1
755	Tray for Wireless Receiver	2377599		1	2
756	Foam - Wireless Receiver Bottom	2377600		1	2
757	Foam - Wireless Receiver Top	2377601		1	2
758	AC Adapter - 9V, 1.1A	2384314		1	1
759	USB Extension Cable	2384449		1	1
760	Battery Charger	2383775		1	1
761	Battery - 9V NiMH	2383776		3	1
762	Microphone	2383779	Over the ear style.	1	1
763	USB Headset	2386172		1	1
764	Wireless Microphone Care Kit	2386142		1	1
765	Beltpack Transmitter - Wireless	2383773		1	1
766	Adapter Kit - 240Vac	2390117		1	1

Section 9-19
Customer Documentation

Figure 9-25 Customer Documentation Package

Table 9-22 Documentation Box Contents

Item	Part Name	Part Number	Description	Qty	FRU
Customer Documentation Collector		2376865	Includes items 800-808	1	N
800	LOGIQ™ 9 Customer Documentation CD	2353630-200	All available documents in PDF format. Can be viewed on the scanner or any PC Includes service and user manuals.	1	N
801	LOGIQ™ 9 Installation Manual	2301715-100	Basic Installation and how to view documents on the CD	1	N
802	LOGIQ™ 9 Quick Guide	2309820-100	Basic scanner operation	1	N
803	LOGIQ™ 9 Release Notes	2320595-100	R2.1.0 Software	1	N
804	LOGIQ™ 9 Release Notes Addendum	2376420-100	R2.1.1 Addendum	1	N
805	LOGIQ™ 9 Quick Card #1	2309821-100		1	N
806	LOGIQ™ 9 EFBW Quick Card	2323180-100	EFBW Procedures	1	N
807	LOGIQ™ 9 AUA vs. CUA (linear regression)	2323181-100	AUA vs. CUA	1	N
808	LOGIQ™ 9 Op Panel P-Key Labels	2376993	Labels for Print Key assignments	1	N

Section 9-20
Probes

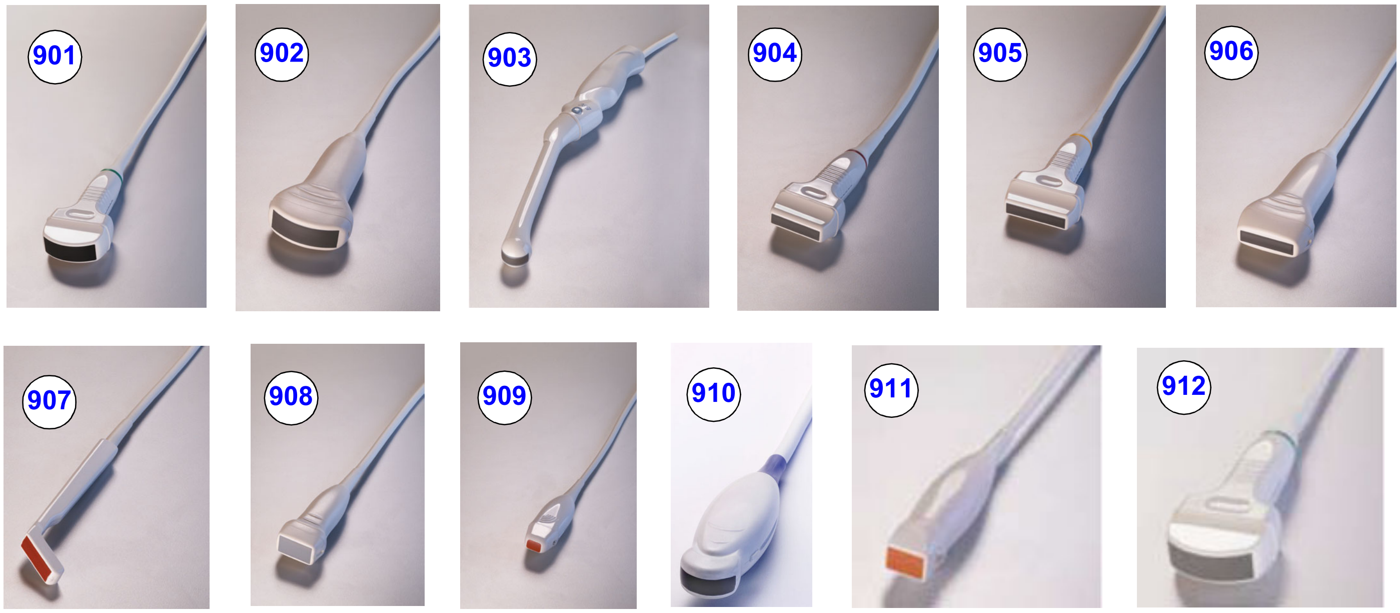


Figure 9-26 LOGIQ™ 9 Probes

Table 9-23 Available Probes

Item	Part Name	Part Number	Description	Qty	FRU
901	3.5C	2296158	H4901PE - PDI		1
902	M7C	2294514	H4901PG - Hino		1
903	E8C	2294641	H4901PM - Hino		1
904	7L	2294521	H4901PH - Hino		1
905	10L	2294523	H4901PJ - Hino		1
906	M12L	2294511	H4901PK - Hino		1
907	i12L	2264883	H4901PL - PDI		1
908	4S	2295658	H4901PB - PDI		1
909	10S	2298589	H4901PC - PDI		1
910	8C	2348094	Q1 2003 Release		1
911	TCD 3S	2323337	T3308MC		1
912	3.5CS	2051858	H40412LK		1
913	Probe Latching Mechanism	2130769	Large round blue locking knob used on some probes		1

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Chapter 10
Periodic Maintenance

Section 10-1
Overview

10-1-1 Purpose of Chapter 10

This chapter describes Periodic Maintenance (PM) and customer performed tasks on the scanner and peripherals. These procedures are intended to maintain the quality of the ultrasound systems performance. Read this chapter completely and familiarize yourself with the procedures before performing a task.

Table 10-1 Contents in Chapter 10

Section	Description	Page Number
10-1	Overview	10-1
10-2	Why do Periodic Maintenance	10-2
10-3	Maintenance Task Schedule	10-2
10-4	Tools Required	10-4
10-5	System Periodic Maintenance	10-7
10-6	Using a Phantom	10-12
10-7	Electrical Safety Tests	10-12
10-8	When There's Too Much Leakage Current...	10-28
	PM INSPECTION Certificate	10-29

CAUTION **Practice good ESD prevention. Wear an anti–static strap when handling electronic parts and even when disconnecting/connecting cables.**

DANGER **THERE ARE SEVERAL PLACES ON THE BACKPLANE, THE AC DISTRIBUTION, AND DC DISTRIBUTION THAT ARE DANGEROUS. BE SURE TO DISCONNECT THE SYSTEM POWER PLUG AND OPEN THE MAIN CIRCUIT BREAKER BEFORE YOU REMOVE ANY PARTS. BE CAUTIOUS WHENEVER POWER IS STILL ON AND COVERS ARE REMOVED.**

CAUTION **Do not pull out or insert circuit boards while power is ON.**

CAUTION **Do not operate this unit unless all board covers and frame panels are securely in place. System performance and cooling require this.**

Section 10-2
Why do Periodic Maintenance

10-2-1 Keeping Records

It is good business practice that ultrasound facilities maintain records of periodic and corrective maintenance. The Ultrasound Periodic Maintenance Inspection Certificate provides the customer with documentation that the ultrasound scanner is maintained on a periodic basis.

A copy of the Ultrasound Periodic Maintenance Inspection Certificate should be kept in the same room or near the scanner.

10-2-2 Quality Assurance

In order to gain accreditation from organizations such as the American College of Radiology (USA), it is the customer’s responsibility to have a quality assurance program in place for each scanner. The program must be directed by a medical physicists, the supervising radiologist/physician or appropriate designee.

Routine quality control testing must occur regularly. The same tests are performed during each period so that changes can be monitored over time and effective corrective action can be taken.

Testing results, corrective action and the effects of corrective action must be documented and maintained on the site.

Your GE service representative can help you with establishing, performing and maintaining records for a quality assurance program.

Section 10-3
Maintenance Task Schedule

10-3-1 How often should maintenance tasks be performed?

The Maintenance Task Schedule specifies how often your LOGIQ™ 9 should be serviced and what items need attention. It is the customer’s responsibility to ensure the LOGIQ™ 9 periodic maintenance is performed as scheduled in order to retain its high level of safety, dependability and performance.

Your GE Service Representative knows your LOGIQ™ 9 best and can provide competent, efficient service. Please contact us for further information and to schedule GE Medical Systems Ultrasound to perform this service for you.

The services and intervals shown in the maintenance schedule assumes that you use your LOGIQ™ 9 for an average patient load (10-12 per day) and not use it as a primary mobile unit which is transported between diagnostic facilities.

If conditions exist which exceed typical usage and patient load, then it is recommended to increase the periodic maintenance frequencies.

Table 10-2 Customer Performed Maintenance Tasks

Service at Indicated Time	Daily	Weekly	Monthly	Per Facilities QA Program	Notes
Clean Probes	●*				* or before each use
Clean Probe Holders	●				
Clean Air Filter		●			more frequently depending on your environment
Inspect AC Mains Cable			●		Mobile Unit Check Weekly
Inspect Cables and Connectors			●		
Clean Console			●		
Clean Monitor and Touch Panel			●		
Inspect Wheels, Casters, brakes and Swivel Locks			●		Mobile Unit Check Daily
Check Control Panel Movement			●		Mobile Unit Check Daily
Console Leakage Current Checks				See Note 1 See Note 2	also after corrective maintenance or as required by your facilities QA program
Peripheral Leakage Current Checks				See Note 1 See Note 2	also after corrective maintenance or as required by your facilities QA program
Surface Probe Leakage Current Checks				See Note 1 See Note 2	also after corrective maintenance or as required by your facilities QA program
Endocavity Probe Leakage Current Checks				See Note 1 See Note 2	also after corrective maintenance or as required by your facilities QA program
Transesphongeal Probe Leakage Current Checks				See Note 1 See Note 2	also after corrective maintenance or as required by your facilities QA program
Surgical Probe Leakage Current Checks				See Note 1 See Note 2	also after corrective maintenance or as required by your facilities QA program
Measurement Accuracy Checks				See Note 1 See Note 2	also after corrective maintenance or as required by your facilities QA program
Probe/Phantom Checks				See Note 1 See Note 2	also after corrective maintenance or as required by your facilities QA program
Functional Checks				See Note 1 See Note 2	also after corrective maintenance or as required by your facilities QA program

Note 1: These specific tasks are completed during GE performed PMs or any time corrective maintenance is performed by GE.

Note 2: May require specialized equipment to complete.

Section 10-4
Tools Required

10-4-1 Standard GE Tool Kit

The following is a description of the “Standard” GE tool kit in the USA. Not all tools are required for PMs.

Table 10-3 Overview of GE-1 Tool Kit Contents

Tool ID	Description	Tool ID	Description
9-45358	Pliers Retaining Ring	9-XL9971MM	Xcelite-hex Blade 1.27mm
9-4078	Scribe	9-XL9972MM	Xcelite-hex Blade 1.5mm
9-44572	Wrench Open End 3/8 - 7/16	9-XL9973MM	Xcelite-hex Blade 2 mm
9-44579	Wrench Open End 1/2 - 9/16	9-XL9974MM	Xcelite-hex Blade 2.5mm
9-44579	Wrench Open End 1/2 - 9/16	9-XL9975MM	Xcelite-hex Blade 3mm
9-45385	Pliers, Arc Joint 7 inch	9-XL9976MM	Xcelite-hex Blade 4mm
9-45378	Pliers, Slip Joint	9-XL9977MM	Xcelite-hex Blade 5mm
9-4518	Pliers, Long Nose, Miniature	9-XL991CM	Handle
9-4518	Pliers, Long Nose, Miniature	C2356E	Screw starter - Kedman Quick Wedge
9-44776	Ignition Wrench Set, 10 pc.	BLBO	Box - 18 Compartment
9-44601	Wrench, Adj., 4 inch	DWL4283T	Box - 5 Compartment
9-4151	Screwdriver, Blade, Stubby	9-41322	Pickup Tool, Claw type
9-41421	Screwdriver, Blade, Pocket clip	9-6757	6 pc Needle File Set
9-41594	Screwdriver, Blade 1/8 in. x 4 in.	9-9487	Utility Knife
9-41581	Screwdriver, Blade 3/16 in. x 4 in.	9-45341	Pliers Vice Grip 10 inch
9-39451	20' Steel Tape, locking Spring load	9-3001	Xacto Pen Knife
9-GH807	Ratchet, Offset, Slotted	9-HT62002	Solder Aid, Fork and Hook
68-412	Ratchet, Offset, Phillips	9-4099	Mirror, Round, Telescoping
9-GH130	Tapered Reamer	9-GH3001	Steel Rule Decimal 6 inch
9-41584	Screwdriver, slotted 1/4 in.X 6 in.	9-GH300ME	Steel Rule Metric 6 inch
9-4118	Screwdriver, Phillips #2, Stubby	9-XL9920	Xcelite-hex Blade.050 inch
9-41293	Screwdriver, Phillips #0	9-XL9921	Xcelite-hex Blade 1/16 inch
9-41294	Screwdriver, Phillips #1	9-XL9922	Xcelite-hex Blade 5/16 inch
9-41295	Screwdriver, Phillips #2	9-XL9923	Xcelite-hex Blade 3/32 inch
9-46677	Hex Keys, 20 pc., Metric	9-XL9924	Xcelite-hex Blade 1/8 inch
9-34701	1/4 in. Standard.Socket set (19 pc)	9-XL9925	Xcelite-hex Blade 5/32 inch
9-43499	1/2 inch Socket 1/4 inch drive	9-XL9926	Xcelite-hex Blade 3/16 inch
9-4355	Flex Spinner	9-XL99764	Xcelite-hex Blade 7/64
9-43523	Breaker	9-XL99964	Xcelite-hex Blade 9/64
9-43531	6 inch Ext.	9-XLM60	Mini-screwdriver kit

Table 10-3 Overview of GE-1 Tool Kit Contents (Continued)

Tool ID	Description	Tool ID	Description
9-65283	Case 8.5 in. x 4.5 in. x 2 in. Deep	9-45072	Pliers 6 inch Diagonal
9-46696	Hex Keys	9-XL100X	Wire Stripper/Cutter 5 inch - 100X
9-39829	Torpedo Level, Magnetic	9-XL87CG	Pliers - very fine needle nose-87CG
9-38461	Hammer, Ball Peen, 4 oz	9-WEWDT-07	Weller-Soldering-Replacement Tip(1)
9-4280	Universal Joint 1/4 inch	9-WS175-E	Wiss - Surgical Scissors
9-WEW60P3	Weller - Soldering Iron, 3 wire	KH174	Hemostat 5 inch Straight
9-WECT5B6	Weller - Soldering Iron Tip	KH175	Hemostat 5 inch curved
9-WEWDP12	Weller - Desoldering Pump	9-Z9480121	Alignment tool (red)
93383	Flashlight Mini-Mag Lite (AAA Bat.)		
9-GH408	Tweezers		
21576	Brush - Bristle		
9-4516	Pliers 4 1/4 inch Diagonal		

Table 10-4 Overview of GE-2 Tool Kit Contents

GE-2 Sears Kit (#99034)			
Tool ID	**Description**	**Tool ID**	**Description**
9-45381	Pliers, Arc Joint 9 1/2 inch	9-44067	Socket 1 1/16 in. for 1/2 in. drive
9-45092	Pliers, Linesman 8 1/2 inch	9-42679	Socket 10MM Hex for 1/2 in. drive (2273333)
9-42882	Punch, Pin 3/32 inch	9-44262	Extension 10 inch for 1/2 in. drive (2273405)
9-42884	Punch, Pin 5/32 inch	9-4258	3/8 inch to 1/2 inch Adapter
9-42886	Punch, Pin 1/4 inch	9-34374	3/8 inch Metric Socket Set - 12 PT
9-42973	Cold Chisel 1/2 inch	9-44311	16mm Socket 12 pt.
9-GH77	Center Punch Automatic	9-33485	Metal Socket Tray
9-GH890	File Handle, Adj.	9-33484	Metal Socket Tray
9-31276	File, Round, Bastard 8 inch	9-33484	Metal Socket Tray
9-31277	File, Half Round, Bastard 8 inch	9-52068	Tap and Drill Set
9-31263	File, Flat Mill 8 inch	9-52722	#6 Tap
21045C	Close Quarter Saw	9-52723	#8 Tap
9-44604	Wrench, Adj 10 inch		High Speed Drill Set
9-41587	Screwdriver 5/16 inch x 8 inch		#36 Drill
9-41586	Screwdriver, Stubby 5/16 inch		#29 Drill
9-GH19512	Countersink 1/2 inch	9-44046	3/8 inch Socket Set
9-44741	12 PC Combination Wrench Set		

10-4-2 Special Tools, Supplies and Equipment

10-4-2-1 Specific Requirements for Periodic Maintenance

See Chapter 7

Table 10-5 Overview of Requirements for Periodic Maintenance

Tool	Part Number	Comments
Digital Volt Meter (DVM)		
Electric Safety Analyzer DALE 600	46-285652G1	For 120V Unit
Electric Safety Analyzer DALE 600E	46-328406G2	For 220V Units
Leakage Current Ultrasound Kit	2113015	For 120V and 220V Units
Anti Static Kit	46–194427P231 46–194427P279 46–194427P369 46–194427P373 46–194427P370	Kit includes anti–static mat, wrist strap and cables for 200 to 240 V system 3M #2204 Large adjustable wrist strap 3M #2214 Small adjustable wrist strap 3M #3051 conductive ground cord
Anti Static Vacuum Cleaner	46–194427P278 46–194427P279	120V 230V
Air Filter	Section 9-16	air intake
Safety Analyzer	46–285652G1	DALE 600 KIT (or equivalent) for electrical tests
SVHS VCR Cassette	E7010GG E7010GF	60 minute 120 minute
SVHS VCR Head Cleaner		See VCR user manual for requirements
3.5” MOD MEDIA	E8381AA E8381AB	blank 128 M disk blank 230 M disk
5.25” MOD Media		
3.5” MOD Media Cleaner	2117811	cleans the diskettes
5.25” MOD Media Cleaner		cleans the diskettes
3.5” MOD Head Cleaner Kit	2148392	cleans the drive heads
5.25” MOD Head Cleaner Kit		cleans the drive heads
QIQ Phantom	E8370RB	RMI Grayscale Target Model 403GS
CD-RW Media		For LOGIQ™ 9 ???
B/W Printer Cleaning Sheet		See printer user manual for requirements
Color Printer Cleaning Sheet		See printer user manual for requirements
Disposable Gloves		

Section 10-5
System Periodic Maintenance

10-5-1 Preliminary Checks

The preliminary checks take about 15 minutes to perform. Refer to the system user documentation whenever necessary.

Table 10-6 System Preliminary Checks

Step	Item	Description
1	Ask & Listen	Ask the customer if they have any problems or questions about the equipment.
2	Paperwork	Fill in the top of the Periodic Maintenance (PM) Inspection Certificate. Note all probes and system options.
3	Power up	Turn the system power on and verify that all fans and peripherals turn on. Watch the displays during power up to verify that no warning or error messages are displayed.
4	Probes	Verify that the system properly recognizes all probes.
5	Displays	Verify proper display on the monitor and touch panel.
6	Presets	Backup all customer presets on an CD-RW.

10-5-2 Functional Checks (See Also Chapter 4)

The functional checks take about 60 minutes to perform. Refer to the system user documentation whenever necessary.

10-5-2-1 System Checks

Table 10-7 System Functional Checks

Check	Step	Description
	B-Mode	Verify basic B-Mode (2D) operation. Check the basic system controls that affect this mode of operation.
	CF-Mode	Verify basic CF-Mode (Color Flow Mode) operation. Check the basic system controls that affect this mode of operation.
	Doppler Modes	Verify basic Doppler operation (PW and CW if available). Check the basic system controls that affect this mode of operation.
	M-Mode	Verify basic M-Mode operation. Check the basic system controls that affect this mode of operation.
	*Applicable Software Options	Verify the basic operation of all optional modes such as Multi-Image, 3D, Contrast, Harmonics, Cine, Stress Echo,... etc. Check the basic system controls that affect each options operation.
	Xmit/Recv Elements	Use the Visual Channel Utilityon the 10L probe to verify that all system xmit/recv channels are functional.
	Keyboard Test	Perform the Keyboard Test Procedure to verify that all keyboard controls are OK.
	Monitor	Verify basic Monitor display functions. Refer to Chapter 3 of the User Manual.
	Touch Panel	Verify basic Touch Panel display functions. Refer to Chapter 3 of the User Manual.
	Measurements	Scan a gray scale phantom and use the measurement controls to verify distance and area calculation accuracy. Refer to the User Manual, Chapter 18, for measurement accuracy specifications.

*NOTE: * Some software may be considered standard depending upon system model configuration.*

10-5-2-2 Peripheral/Option Checks

If any peripherals or options are not part of the system configuration, the check can be omitted. Refer to the User Manual for a list of approved peripherals/options.

Table 10-8 GE Approved Peripheral/Hardware Option Functional Checks

Step	Item	Description
1	VCR	Verify record/playback capabilities of the VCR. Clean heads and covers if necessary.
2	B/W Printer	Verify hardcopy output of the B/W video page printer. Clean heads and covers if necessary.
3	Color Printer	Verify hardcopy output of the Color video page printer. Clean heads and covers if necessary.
4	DICOM	Verify that DICOM is functioning properly. Send an image to a DICOM device.
5	InSite/iLinq	Verify that InSite is functioning properly. Ensure two-way remote communications. (Warranty & Contract Customers only)
6	Camera	Verify hardcopy output of the film camera. Clean as necessary.
7	Footswitch	Verify that the footswitch is functioning as programed. Clean as necessary.
8	ECG	Verify basic operation with customer

10-5-3 Input Power

10-5-3-1 Mains Cable Inspection

Table 10-9 Mains Cable Inspection

Step	Item	Description
1	Unplug Cord	Disconnect the mains cable from the wall and system.
2	Inspect	Inspect it and its connectors for damage of any kind.
3	Verify	Verify that the LINE, NEUTRAL and GROUND wires are properly attached to the terminals, and that no strands may cause a short circuit.
4	Verify	Inlet connector retainer is functional.

10-5-4 Cleaning

10-5-4-1 General Cleaning

Table 10-10 General Cleaning

Step	Item	Description
1	Console	Use a fluid detergent in warm water on a soft, damp cloth to carefully wipe the entire system. Be careful not to get the cloth too wet so that moisture does not enter the console.
2	Probe Holder	Clean probe holders (they may need to be soaked to remove excess gel).
3	Monitor and Touch Panel	waiting for procedure from engineering

10-5-4-2 Air Filter Cleaning

Table 10-11 Air Filter Cleaning - frequency varies with your environment

Step	Item	Description
1	Remove Filter Cover	Refer to Chapter 8 for air filter location and removal instructions.
2	Clean Filter	The filters can be cleaned in sprinkling water, or they can be dusted with a vacuum cleaner. If the filter is metal wash and/or vacuum. If the filter is fiber or plastic vacuum or replace.
3	Install Filter	Install the clean filter.

NOTE: For your convenience or of the air filter is too dirty, replacement filters are available. Refer to Chapter 9 for the air filter replacement part number.

10-5-5 Physical Inspection

Table 10-12 Physical Checks

Step	Item	Description
1	Labeling	Verify that all system labeling is present and in readable condition. Refer to the User Manual,..... for details.
2	Scratches & Dents	Inspect the console for dents, scratches or cracks.
3	Control Panel	Inspect keyboard and control panel. Note any damaged or missing items.
4	Control Panel Movement	Verify ease of control panel (Operator I/O Panel) movement in all acceptable directions. Ensure that it latches in position as required.
5	Wheels & Brakes	Check all wheels and casters for wear and verify operation of foot brake, to stop the unit from moving, and release mechanism. Check all caster locks and caster swivel locks for proper operation.
6	Cables & Connectors	Check all internal cable harnesses and connectors for wear and secure connector seating. Pay special attention to footswitch assembly and probe strain or bend reliefs.
7	Shielding & Covers	Check to ensure that all EMI shielding, internal covers, air flow panels and screws are in place. Missing covers and hardware could cause EMI/RFI problems while scanning.
8	External I/O	Check all connectors for damage and verify that the labeling is good.
9	Op Panel Lights	Check for proper operation of all operator panel and TGC lights.
10	Monitor Light	Check for proper operation of any monitor lights if available.
11	External Microphone	Check for proper operation of any external microphones by recording an audio test.

10-5-6 Optional Diagnostic Checks

To complete the PM checks, access the diagnostic software as described in Chapters 5 or 7. View the error logs and run desired diagnostics.

10-5-6-1 View the Logs

1.) Review the system error log for any problems.
2.) Check the temperature log to see if there are any trends that could cause problems in the future.
3.) Check the Configuration Log; update if needed.

10-5-7 Probe Maintenance

10-5-7-1 Probe Related Checks

Table 10-13 Probe Related Checks

Step	Item	Description
1	Probe Holder	Clean probe holders (they may need to be soaked to remove excess gel).
2	Probes	Thoroughly check the system probe connectors and remove dust from inside the connector sockets if necessary. Visually check for bent, damaged or missing pins

10-5-7-2 Basic Probe Care

The system user manuals and various probe handling cards provide a complete description of probe care, maintenance, cleaning and disinfection. Ensure that you are completely familiar with the proper care of GE probes.

Ultrasound probes can be easily damaged by improper handling. See the User Manual and probe care cards for more details. Failure to follow these precautions can result in serious injury and equipment damage. Failure to properly handle or maintain a probe may also void its warranty.

Any evidence of wear indicates the probe cannot be used.

Do a visual check of the probe pins and system sockets before plugging in a probe.

TEE and Interoperative probes often have special considerations and individual probe user manuals. For TEE and Interoperative probes also refer to their separate user manuals.

10-5-7-3 Basic Probe Cleaning

Refer to the User's Manual for details on probe cleaning.

NOTE: *To help protect yourself from blood borne diseases, wear approved disposable gloves. These are made of nitrile derived from vegetable starch to prevent allergic latex reactions.*

NOTE: *Failure to follow the prescribed cleaning or disinfection procedures will void the probe's warranty. DO NOT soak or wipe the lens with any product not listed in the User Manual. Doing so could result in irreparable damage to the probe. Follow care instructions that came with the probe.*

NOTE: *Disinfect a defective probe before you return it. Be sure to tag the probe as being disinfected.*

Section 10-6
Using a Phantom

See the Basic User Manual "*Customer Maintenance*" for information on using a phantom and quality assurance tests.

Section 10-7
Electrical Safety Tests

10-7-1 Safety Test Overview

The electrical safety tests in this section are based on and conform to NFPA 99 (For USA) and IEC 60601-1 Medical Equipment Safety Standards. They are intended for the electrical safety evaluation of cord-connected, electrically operated, patient care equipment. If additional information is needed, refer to the NFPA 99 (For USA) and IEC 60601-1 documents.

⚠ **WARNING** ***THE USER MUST ENSURE THAT THE SAFETY INSPECTIONS ARE PERFORMED AT LEAST EVERY 12 MONTHS ACCORDING TO THE REQUIREMENTS OF THE PATIENT SAFETY STANDARD IEC-EN 60601-1. ONLY TRAINED PERSONS ARE ALLOWED TO PERFORM THE SAFETY INSPECTIONS MENTIONED ABOVE.***

⚠ **CAUTION** **To avoid electrical shock, the unit under test must not be connected to other electrical equipment. Remove all interconnecting cables and wires. The unit under test must not be contacted by users or patients while performing these tests.**

⚠ **CAUTION** **Possible risk of infection. Do not handle soiled or contaminated probes and other components that have been in patient contact. Follow appropriate cleaning and disinfecting procedures before handling the equipment.**

Test the system, peripherals and probes for leakage current. Excessive leakage current can cause injury or death in sensitive patients. High leakage current can also indicate degradation of insulation and a potential for electrical failure. Do not use probes or equipment having excessive leakage current.

To minimize the risk that a probe may shock someone the customer should:

- Not use a probe that is cracked or damaged in any way

.i.Probe Leakage Current, Frequency;

- Check probe leakage current:
    - * Based on your facilities QA program for surface probes
    - * Based on your facilities QA program for endocavitary probes
    - * whenever probe damage is suspected

10-7-2 GEMS Leakage Current Limits

The following limits are summarized for NFPA 99 (For USA) and IEC 60601-1 Medical Equipment Safety Standards. These limits are GEMS standards and in some cases are lower than the above standards listed.

Table 10-14 Chassis Leakage Current Limits—Accessible Metal Surfaces

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral
USA	N/A	0.3 mA	0.3 mA	N/A
Other	0.1 mA	0.5 mA	0.5 mA	0.5 mA

Table 10-15 Type BF Applied Part Leakage Current Limits - Non-Conductive (Floating) Surface and Cavity Probes

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral	*Mains Applied
USA	0.05 mA	0.05 mA	0.05 mA	0.05 mA	N/A
Other	0.1 mA	0.5 mA	0.5 mA	0.5 mA	5.0 mA

Table 10-16 Type CF Applied Part Leakage Current Limits - Surgical Probes and ECG Connections

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral	*Mains Applied
USA	0.01 mA	0.05mA	0.05 mA	N/A	0.025 mA
Other	0.01 mA	0.05 mA	0.05 mA	0.05 mA	0.05 mA

*NOTE: *Mains Applied refers to the sink leakage test where mains (supply) voltage is applied to the part to determine the amount of current that will pass (or sink) to ground if a patient contacted mains voltage.*

The following tests are performed at the factory and should be performed at the site. These tests are: grounding continuity, chassis leakage current, probe leakage current, and ECG leakage current. All measurements are made with an electrical safety analyzer Model 600/600E built by Dale Technology Corporation or equivalent device.

10-7-3 Outlet Test - Wiring Arrangement - USA & Canada

Test all outlets in the area for proper grounding and wiring arrangement by plugging in the neon outlet tester and noting the combination of lights that are illuminated. Any problems found should be reported to the hospital immediately and the receptacle should not be used.

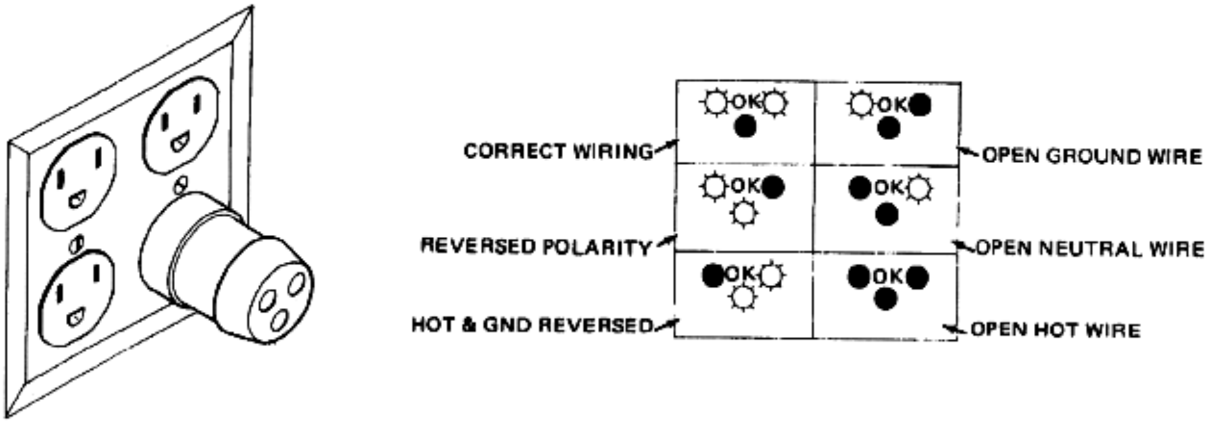
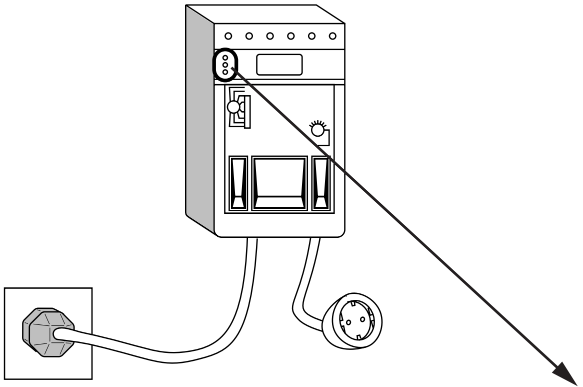


Figure 10-1 Typical Outlet Tester

The Dale 600 has self-contained lamps designed for testing the outlet wiring arrangement. Plug the Dale 600 into each outlet to be tested comparing the lamp status.



Combination of Lights	● ☼ ☼	☼ ☼ ●	● ☼ ●	● ● ●	☼ ● ☼
Condition	CORRECT WIRING	REVERSE POLARITY	OPEN GROUND	OPEN HOT	HOT/GROUND REVERSED

Figure 10-2 Dale 600 Outlet Test

NOTE: *No outlet tester can detect the condition where the Neutral (grounded supply) conductor and the Grounding (protective earth) conductor are reversed. If later tests indicate high leakage currents, this should be suspected as a possible cause and the outlet wiring should be visually inspected.*

10-7-4 Grounding Continuity

CAUTION **Electric Shock Hazard. The patient must not be contacted to the equipment during this test**

Measure the resistance from the third pin of the attachment plug to the exposed metal parts of the case. The ground wire resistance should be less than **0.2** ohms. Reference the procedure in the IEC 601-1.1.

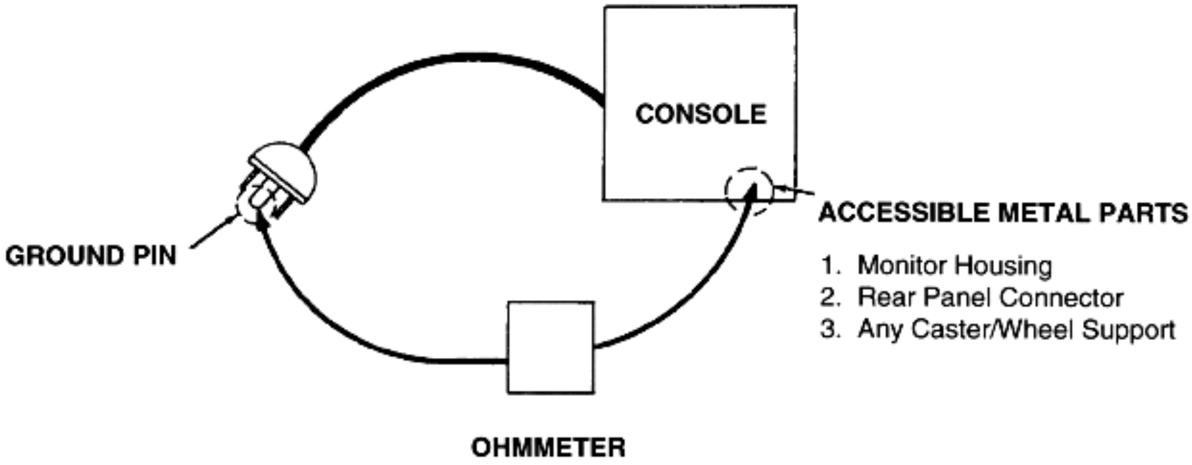


Figure 10-3 Ground Continuity Test

10-7-4-1 Meter Procedure

Follow these steps to test the ground wire resistance.

1.) Turn the LOGIQ™ 9 unit OFF.
2.) Plug the unit into the meter, and the meter into the tested AC wall outlet.
3.) Plug the black chassis cable into the meter's “CHASSIS” connector and attach the black chassis cable clamp to an exposed metal part of the LOGIQ™ 9 unit.
4.) Set the meter's “FUNCTION” switch to the RESISTANCE position.
5.) Set the meter's “POLARITY” switch to the OFF (center) position.
6.) Measure and record the ground wire resistance.

10-7-4-2 Dale 600 - Ground Continuity

The Dale 600 measures line cord resistance from the third pin of the attachment plug to the meter's Chassis Cable clamp. Test the grounding continuity of the system to all exposed metal parts in accordance with the IEC 601-1.1 procedure as above. Refer to the Dale 600 Instruction Manual for meter self tests and operation. Record measured resistance of the grounding continuity. The ground wire resistance should be less than 0.2 (Use any safety analyzer.)

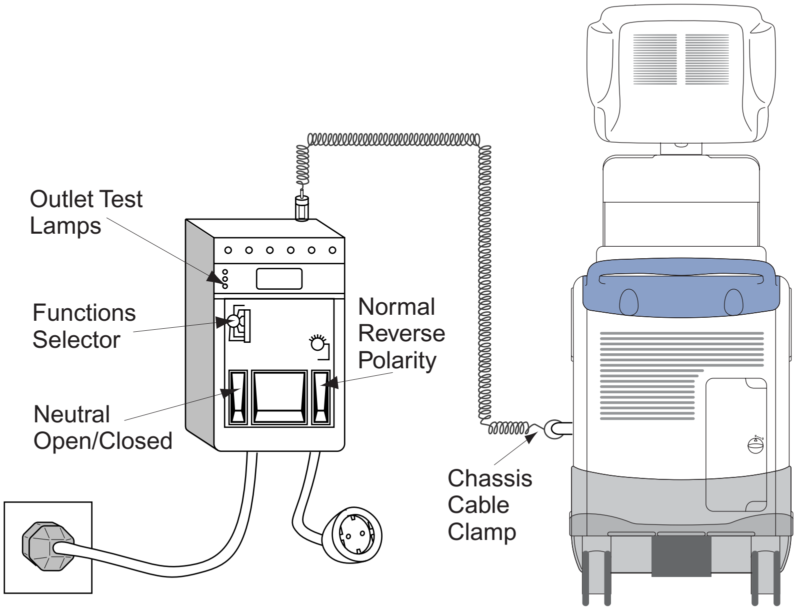


Figure 10-4 Dale 600 Ground Continuity Test

10-7-5 Chassis Leakage Current Test

10-7-5-1 Definition

This test measures the current that would flow in a grounded person who touched accessible metal parts of the bedside station if the ground wire should break. The test verifies the isolation of the power line from the chassis. The meter is connected from accessible metal parts of the case to ground. Measurements should be made with the unit On and Off, with the power line polarity Normal and Reversed. Record the highest reading.

.

⚠ **CAUTION** **Electric Shock Hazard. When the meter's ground switch is OPEN, don't touch the unit!**

⚠ **CAUTION** **Equipment damage possibility. Never switch the Polarity and the status of Neutral when the unit is powered ON. Be sure to turn the unit power OFF before switching them using the POLARITY switch and/or the NEUTRAL switch. Otherwise, the unit may be damaged.**

10-7-5-2 Generic Procedure

The test verifies the isolation of the power line from the chassis. The testing meter is connected from accessible metal parts of the case to ground. Measurements should be made with the unit ON and OFF, with the power line polarity Normal and Reversed. Record the highest reading of current.

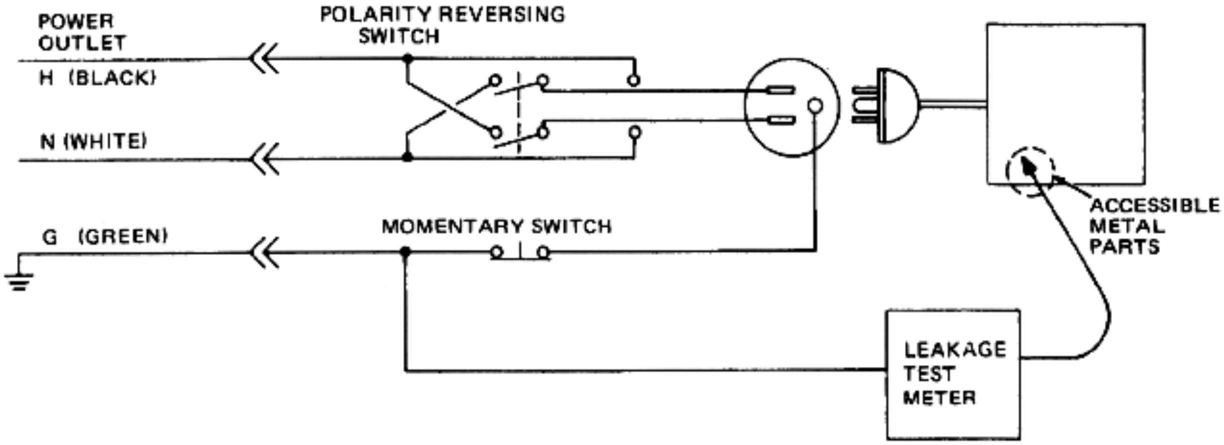


Figure 10-5 Set Up for Chassis Source Leakage Current, IEC 601-1 Clause 19 - Continuos Leakage Currents and Patient, Auxiliary Currents

When using the Microguard or a similar test instrument, its power plug may be inserted into the wall outlet and the equipment under test is plugged into the receptacle on the panel of the meter. This places the meter in the grounding conductor and the current flowing from the case to ground will be indicated in any of the current ranges. The maximum allowable limit for chassis source leakage is shown in Table 10-14.

10-7-5-3 Dale 600 Meter Procedure

When measuring system chassis currents with the Dale 600, always use the CHASSIS selection of the external/chassis function switch. This requires the ground clip lead and changing the meters switches in accordance with the IEC 601-1.1. Refer to the Dale 600 Instruction Manual for meter self-test and operation. Record the highest leakage current measured.

Follow these steps to test the unit for leakage current.

1.) Turn the LOGIQ™ 9 unit OFF.
2.) Plug the unit into the meter, and the meter into the tested AC wall outlet
3.) Plug the black chassis cable into the meter's “CHASSIS” connector and attach the black chassis cable clamp to an exposed metal part of the LOGIQ™ 9.
4.) Set the tester's “FUNCTION” switch to CHASSIS position.

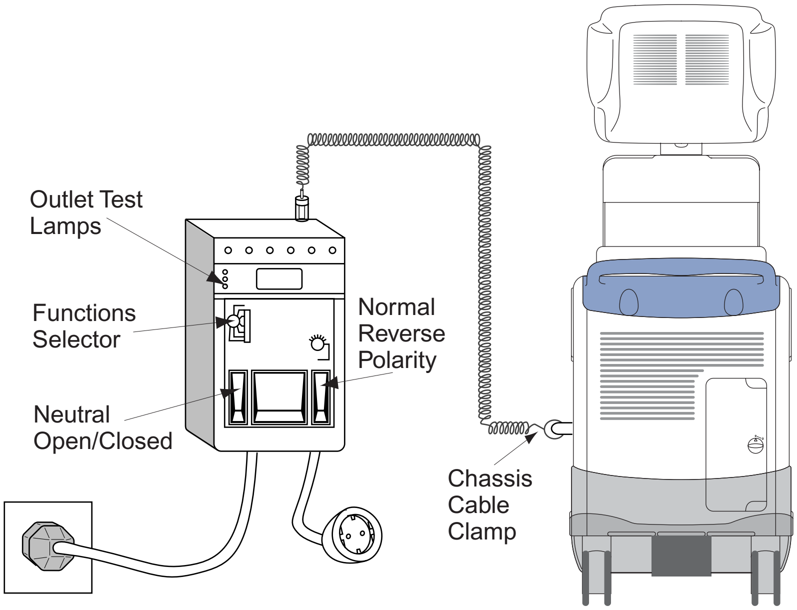


Figure 10-6 Ground and Chassis Leakage Current Test

5.) Follow the test conditions described for respective test points shown in Table 10-17.

Table 10-17 Chassis Leakage Current Test Condition

TEST	CONDITION
1	Mounting screw for probe receptacle
2	caster support
3	Mounting screw for CRT housing
4	Mounting screw for peripheral plugged into unit
5	Mounting screw for other peripheral powered by unit

6.) Keep a record of the results with other hard copies of PM data kept on site.

10-7-5-4 Data Sheet for Chassis Source Leakage Current

The test passes when all readings measure less than the value shown in Table 10-14. Record all data on the PM Inspection Certificate.

Table 10-18 Typical Data Sheet for Chassis Source Leakage Current

Unit Power	Tester Polarity Switch	Tester Neutral or Ground Switch	Test 1 Probe Connector	Test 2 caster	Test 3 CRT	Optional Test 4	Optional Test 5
Enter Name of tested peripheral here:							
ON	NORM	OPEN					
ON	NORM	CLOSED					
ON	REV	OPEN					
ON	REV	CLOSED					
OFF	NORM	OPEN					
OFF	NORM	CLOSED					
OFF	REV	OPEN					
OFF	REV	CLOSED					

10-7-6 Isolated Patient Lead (Source) Leakage–Lead to Ground

10-7-6-1 Definition

This test measures the current which would flow to ground from any of the isolated ECG leads. The meter simulates a patient who is connected to the monitoring equipment and is grounded by touching some other grounded surface. Measurements should be made with the ground open and closed, with power line polarity normal and reversed, and with the ultrasound console Off and On. For each combination the operating controls, such as the lead switch, should be operated to find the worst case condition.

CAUTION **Equipment damage possibility. Never switch the Polarity when the unit is powered ON. Be sure to turn the unit power OFF before switching the polarity using the POLARITY switch. Otherwise, the unit may be damaged.**

10-7-6-2 Generic Procedure

Measurements should be made with the ground open and closed, with power line polarity normal and reversed, and with the unit Off and On. For each combination, the operating controls such as the lead switch should be operated to find the worst case condition.

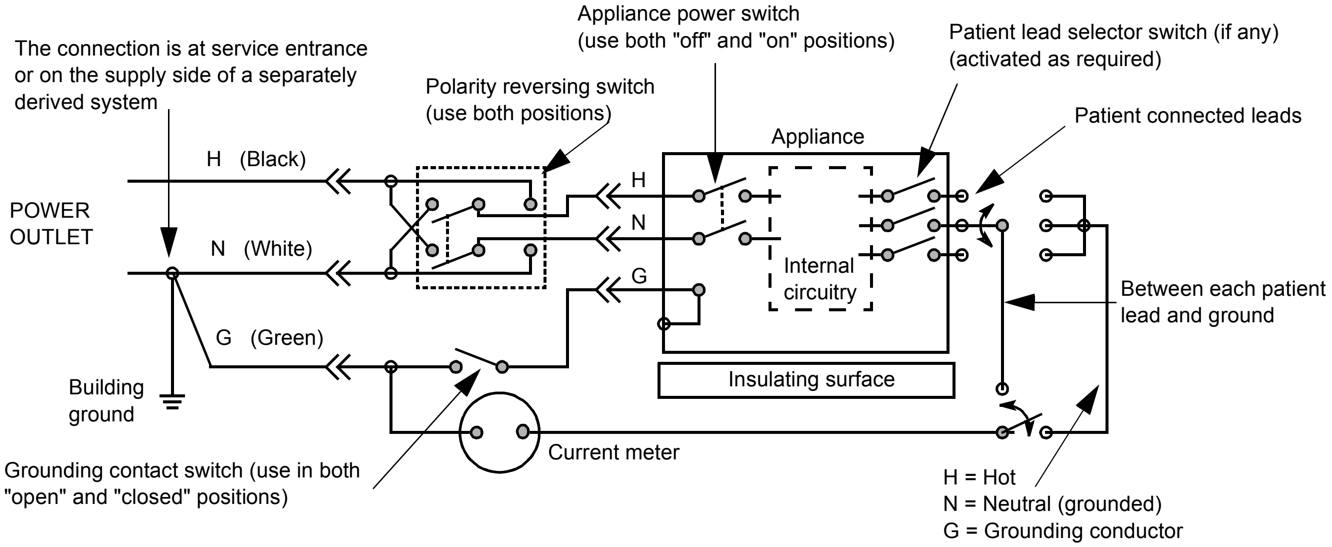

The connection is at service entrance or on the supply side of a separately derived system
Appliance power switch (use both "off" and "on" positions)
Patient lead selector switch (if any) (activated as required)
Polarity reversing switch (use both positions)
Patient connected leads
Appliance
H (Black)
H
POWER OUTLET
N
N (White)
G
Internal circuitry
Between each patient lead and ground
G (Green)
Insulating surface
Building ground
Current meter
Grounding contact switch (use in both "open" and "closed" positions)
H = Hot
N = Neutral (grounded)
G = Grounding conductor

Figure 10-7 Test Circuit for Measuring Non-Isolated Patient Leads

10-7-6-3 Dale 600 Meter Procedure

The Dale 600 provides five snap type ECG buttons for testing patient leads. Snap on all patient leads to the meter and assure that the ground clip is connected to the system’s ground terminal. Select the meter’s LEAD-GND function. Select and test each ECG lead positions (except “ALL”) of the LEAD selector, testing each to the power condition combinations found in “PATIENT LEAD LEAKAGE” table in the “PM CHECKLIST”. Record the highest leakage current measured for each Power selection.

⚠ **CAUTION** **Line voltage is applied to the ECG leads during this test. To avoid possible electric shock hazard, the system being tested must not be touched by patients, users or anyone while the ISO TEST switch is depressed. When the meter's ground switch is OPEN, don't touch the unit!**

Follow these steps to test the ECG module for leakage current.

1.) Turn the LOGIQ™ 9 unit OFF.
2.) Plug the unit into the meter, and the meter into the tested AC wall outlet.
3.) Plug the black chassis cable into the meter's “CHASSIS” connector and attach the black chassis cable clamp to an exposed metal part of the LOGIQ™ 9 unit.
4.) Connect the patient leads to the corresponding snaps located at the upper front of the Dale 600/ 600E. Lead nomenclature for this test is not important.

10-7-6-3Dale 600 Meter Procedure (cont'd)

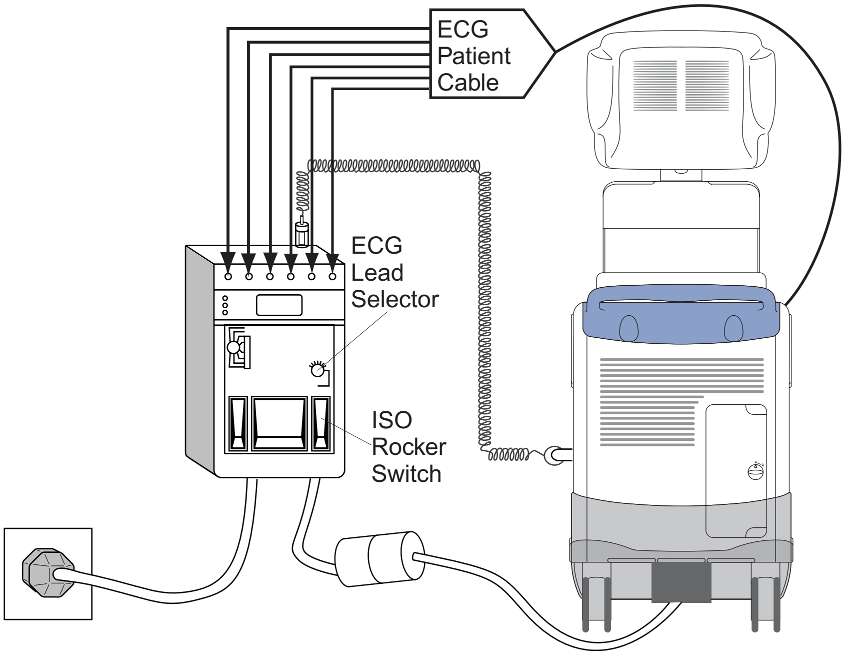


Figure 10-8   ECG Leakage Current Test

5.) Set the meter's "FUNCTION" switch to LEAD TO GROUND position to measure the patient lead to ground leakage current.

6.) Select and test each ECG lead positions (except ALL) of the LEAD selector, testing each to the power condition combinations.

Table 10-19 Testing Power Conditions

ECG Power	Meter's Polarity Switch	Meter's Neutral Switch
ON	NORM	CLOSED
ON	NORM	OPEN
ON	REVERSE	CLOSED
ON	REVERSE	OPEN
OFF	NORM	CLOSED
OFF	NORM	OPEN
OFF	REVERSE	CLOSED
OFF	REVERSE	OPEN

10-7-6-3 Dale 600 Meter Procedure (cont'd)

7.) Record the patient lead to ground leakage current measured on the data sheet.
8.) Set the meter's "FUNCTION" switch to LEAD TO LEAD position to measure the lead to lead leakage current.
9.) Select and test each ECG lead positions (except ALL) of the LEAD selector, testing each to the power condition combinations.
10.) Record the lead to lead leakage current measured on the data sheet.
11.) Set the meter's "FUNCTION" switch to LEAD ISO position to measure the patient lead isolation current.
12.) Select and test each ECG lead positions (except ALL) of the LEAD selector, testing each to the power condition combinations.
13.) Depress the rocker switch to ISO TEST and read the isolation current. To apply the voltage to the lead safely, the voltage is only applied when the rocker switch is depressed to ISO TEST.
14.) Record the patient lead isolation current measured on the data sheet.

10-7-7 Isolated Patient Lead (Source) Leakage–Lead to Lead

Reference the procedure in the IEC 60601-1. When using the Dale 600, switch the meter's function selector to the LEAD-LEAD position. Select and test each of the five ECG lead positions (except ALL) on the LEAD selector, testing each to the power condition combinations found in the table. Record the highest leakage current measured.

10-7-7-1 Dale 600 Patient Lead Tests

NEUTRAL POLARITY

1.) Closed Normal
2.) Open Normal
3.) Closed Reversed
4.) Open Reversed

10-7-8 Isolated Patient Lead (Sink) Leakage-Isolation Test

Reference the procedure in the IEC 60601-1. When using the Dale 600, switch the meter's function selector to the LEAD-ISO. Select the ALL position on the lead selector. Depress the rocker switch to ISO TEST to test lead isolation.

⚠ **CAUTION** **Line voltage is applied to the ECG leads during this test. To avoid possible electric shock hazard, the system being tested must not be touched by patients, users or anyone while the ISO TEST switch is depressed.**

NOTE: It is not necessary to test each lead individually or power condition combinations as required in previous tests.

10-7-8-1 Data Sheet for ECG Leakage Current

The test passes when all readings measure less than the value shown in the table below. Record all data on the PM Inspection Certificate.

Table 10-20 Maximum Allowance Limit for ECG Leakage Current

	AC Power Source	Maximum Allowance Limit	
		GROUND OPEN	GROUND CLOSED
Patient Lead to Ground Leakage Current Test and Patient Lead to Lead Leakage Current Test	115V	10uA	10uA
	220/240V	500uA	10uA

Table 10-21 Maximum Allowance Limit for ECG Leakage Current

	AC Power Source	Maximum Allowance Limit
Patient Lead Isolation Current Test	115V	20uA
	220/240V	5mA

Table 10-22 Typical Data Sheet for ECG Leakage Current

ECG Power	Tester Polarity Switch	Tester Ground Switch	Tester Lead Selector				
			RL	RA	LA	LL	C
ON	NORM	CLOSED					
ON	REVERSE	CLOSED					
ON	NORM	OPEN					
ON	REVERSE	OPEN					
OFF	NORM	CLOSED					
OFF	REVERSE	CLOSED					
OFF	NORM	OPEN					
OFF	REVERSE	OPEN					

10-7-9 Probe Leakage Current Test

10-7-9-1 Definition

This test measures the current that would flow to ground from any of the probes through a patient who is being scanned and becomes grounded by touching some other grounded surface.

10-7-9-2 Generic Procedure

Measurements should be made with the ground open and closed, with power line polarity normal and reversed, and with the unit Off and On. For each combination, the probe must be active to find the worst case condition.

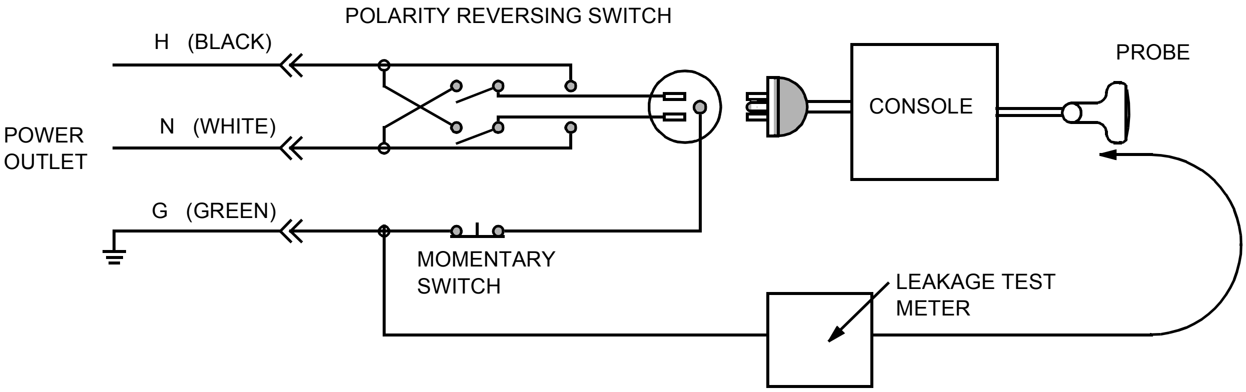


Figure 10-9 Set Up for Probe Leakage Current

NOTE: *Each probe will have some amount of leakage current, dependent on its design. Small variations in probe leakage currents are normal from probe to probe. Other variations will result from differences in line voltage and test lead placement.*

10-7-9-3 Meter Procedure Using Probe Adapter

The Dale 600/600E provides a method for testing probes independently from the system. The meter utilizes a probe adapter to apply a test potential commonly to all connector pins.

The probe's imaging area is immersed in a saline solution along with a grounding probe from the meter to complete the current path. Saline solution is a mixture of water and salt. The salt adds a free ion to the water, making it conductive. Normal saline solution is 0.9% salt or 1/2 gram salt per 1 liter of water. If saline is not available, a mixture of 1 quart water with one or more grams of table salt, mixed thoroughly, will substitute.

⚠ **CAUTION** **To avoid probe damage and possible electric shock, do not immerse probes into any liquid beyond the level indicated in the probe users manual. Do not touch the probe, conductive liquid or any part of the unit under test while the ISO TEST switch is depressed.**

Follow these steps to test each transducer for leakage current.

1.) Turn the LOGIQ™ 9 unit OFF.
2.) Plug the unit into the test meter, and the meter into the tested AC wall outlet.
3.) Connect the probe for test with the meter's appropriate adapter.
4.) Plug the saline probe into the meter's “CHASSIS” connector.
5.) Plug the probe adapter into the meter's connector marked “EXTERNAL”.

10-7-9-3Meter Procedure Using Probe Adapter (cont'd)

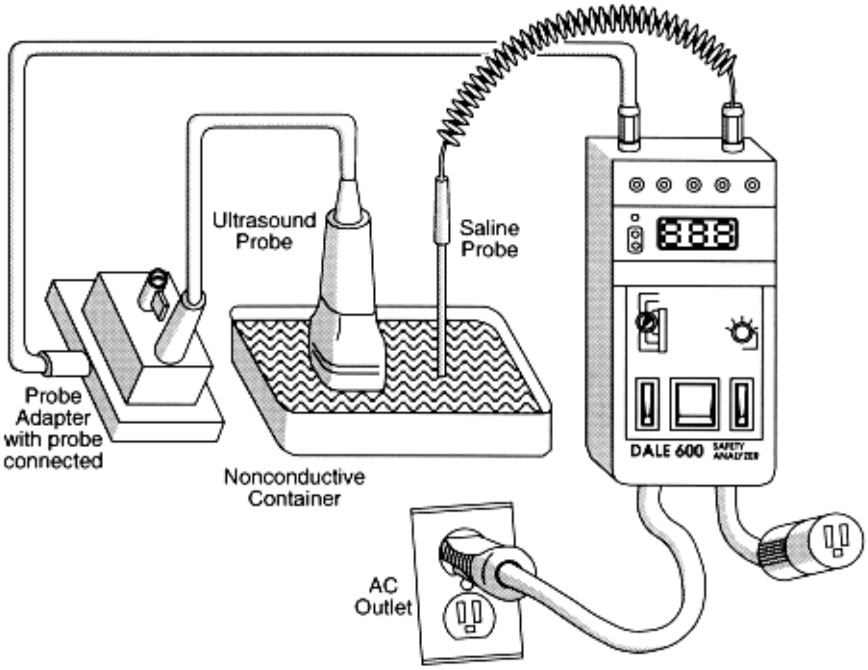


Figure 10-10 Transducer Source Leakage Current Test

6.) Set the meter's "FUNCTION" switch to EXTERNAL position.
7.) Add the saline probe and the imaging area of the probe into the saline bath.
8.) Have unit power ON for the first part; turn it OFF for the second half.
9.) Depress the ISO TEST rocker switch and record the highest current reading.
10.) Follow the test conditions described in Table 10-23 for every transducer.
11.) Keep a record of the results with other hand copies of PM data.

10-7-9-4 No Meter Probe Adapter Procedure

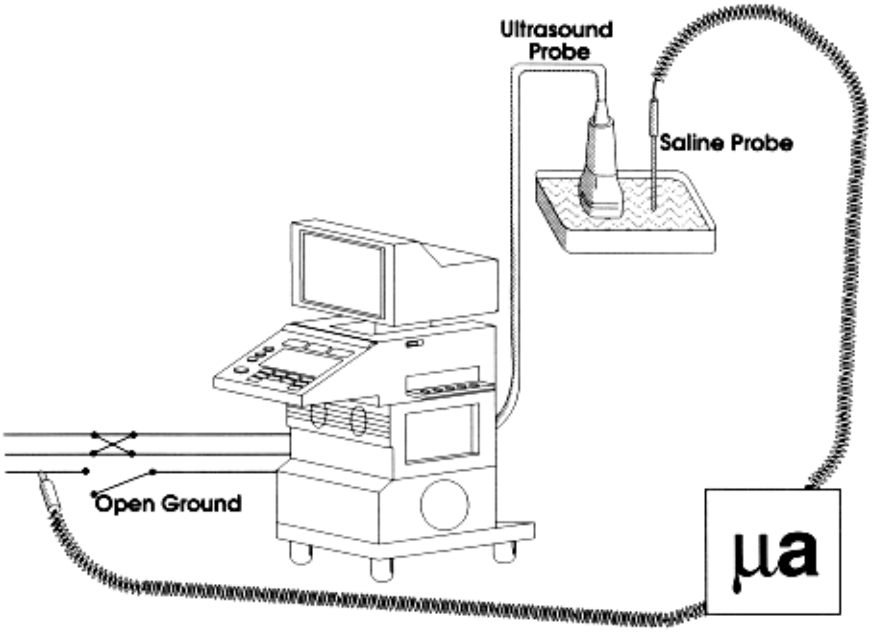


Figure 10-11 Check Without Probe Adapter

Follow these steps to test each transducer for leakage current.

1.) Turn the LOGIQ™ 9 unit OFF.
2.) Plug the unit into the test meter, and the meter into the tested AC wall outlet.
3.) Plug the external probe into the meter's (Dale 600) “EXTERNAL” connector.
4.) Set the meter's “FUNCTION” switch to EXTERNAL position.
5.) Connect the probe for test with the connector of the console.
6.) Add the saline probe and the imaging area of the probe into the saline bath.
7.) Have unit power ON for the first part; turn it OFF for the second half.
8.) Depress the ISO TEST rocker switch and record the highest current reading.
9.) Follow the test conditions described in Table 10-23 for every transducer.
10.) Keep a record of the results with other hand copies of PM data.

10-7-9-5 Data Sheet for Transducer Source Leakage Current

The test passes when all readings measure less than the values shown in Table 10-15 and Table 10-16. Record all data on the PM Inspection Certificate.

⚠ **CAUTION** **Equipment damage possibility. Never switch the Polarity and the status of Neutral when the unit is powered ON. Be sure to turn the unit power OFF before switching them using the POLARITY switch and/or the NEUTRAL switch. Otherwise, the unit may be damaged**

.

Table 10-23 Typical Data Sheet For Transducer Source Leakage Current

Transducer Tested:			
Unit Power	**Tester Power Polarity Switch**	**Tester GROUND or NUETRAL Switch**	**Measurement**
ON	NORM	OPEN	
ON	NORM	CLOSED	
ON	REV	OPEN	
ON	REV	CLOSED	
OFF	NORM	OPEN	
OFF	NORM	CLOSED	
OFF	REV	OPEN	
OFF	REV	CLOSED	

Section 10-8
When There's Too Much Leakage Current...

CHASSIS FAILS

Check the ground on the power cord and plug for continuity. Ensure the ground is not broken, frayed, or intermittent. Replace any defective part.

Tighten all grounds. Ensure star washers are under all ground studs.

Inspect wiring for bad crimps, poor connections, or damage.

Test the wall outlet; verify it is grounded and is free of other wiring abnormalities. Notify the user or owner to correct any deviations. As a work around, check the other outlets to see if they could be used instead.

NOTE: No outlet tester can detect the condition where the white neutral wire and the green grounding wire are reversed. If later tests indicate high leakage currents, this should be suspected as a possible cause and the outlet wiring should be visually inspected.

PROBE FAILS

Test the probe in another connector to isolate if the fault lies with the probe or the scanner.

NOTE: Each probe will have some amount of leakage, dependent on its design. Small variations in probe leakage currents are normal from probe to probe. Other variations will result from differences in line voltage and test lead placement. The maximum allowable leakage current for body surface contact probe differs from inter-cavity probe. Be sure to enter the correct probe type in the appropriate space on the check list.

If excessive leakage current is slot dependent, inspect the system connector for bent pins, poor connections, and ground continuity.

If the problem remains with the probe, replace the probe.

PERIPHERAL FAILS

Tighten all grounds. Ensure star washers are under all ground studs.

Inspect wiring for bad crimps, poor connections, or damage.

STILL FAILS

If all else fails, begin isolation by removing the probes, external peripherals, then the on board ones, one at a time while monitoring the leakage current measurement.

NEW UNIT

If the leakage current measurement tests fail on a new unit and if situation can not be corrected, submit a Safety Failure Report to document the system problem. Remove unit from operation.

ECG FAILS

Inspect cables for damage or poor connections.

PM INSPECTION CERTIFICATE

Customer Name:		System ID:	Dispatch Number / Date Performed:	Warranty/Contract/HBS
System Type		Model Number:	Serial Number:	Manufacture Date:
Probe 1:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 2:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 3:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 4:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 5:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 6:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 7:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 8:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 9:	Frequency:	Scan Format*:	Model Number:	Serial Number:

* Scan Format: Phased Array, Linear Array, Curved Array, Mechanical Array or Other

FUNCTIONAL CHECKS

Functional Check (if applicable)	OK? or N/A
B-Mode Function	
Doppler Modes Function	
CF-Mode Function	
M-Mode Function	
Applicable Software Options	
Applicable Hardware Options	
Control Panel	
Monitor	
Touch Panel	
Measurement Accuracy	
GE Approved Peripherals	

PHYSICAL INSPECTION AND CLEANING

Physical Inspection and Cleaning (if applicable)	Inspect	Clean
Console		
Monitor		
Touch Panel		
Air Filter		
Probe Holders		
External I/O		
Wheels, Brakes & Swivel Locks		
Cables and Connectors		
GE Approved Peripherals (VCR, CD-RW, MOD, Printers)		

COMMENTS:

ELECTRICAL SAFETY

Electrical Test Performed	Max Value Allowed	Value Measured	OK?	Comments
Outlet (correct ground &wiring config.)				
System Ground Continuity				
Chassis Source Leakage Current - Probe				
Chassis Source Leakage Current - Caster				
Chassis Source Leakage Current - CRT				
Patient Lead Source Leakage (Lead to Ground)				
Patient Lead Source Leakage (Lead to Lead)				
Patient Lead Source Leakage (Isolation)				
Peripheral 1 Leakage Current				
Peripheral 1Ground Continuity				
Peripheral 2 Leakage Current				
Peripheral 2Ground Continuity				
Peripheral 3 Leakage Current				
Peripheral 3Ground Continuity				
PROBES				
Probe Number (from previous page)	**Max Value Allowed**	**Max Value Measured**	**OK?**	**Comments**
Probe 1:				
Probe 2:				
Probe 3:				
Probe 4:				
Probe 5:				
Probe 6:				
Probe 7:				
Probe 8:				
Probe 9:				

Final Check. All system covers are in place. System scans with all probes as expected.

Accepted by: ____

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